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Long-Span Construction On Rural Telephone Lines

By RAY BLAIN

AN ANSWER, in part at least, to rural problems of today, is the development of long-span construction, utilizing high strength line wire. Results from test installations indicate that this new type of rural construction offers possibilities for improving rural service as well as reducing construction and maintenance costs

LONG-SPAN construction is one of the important recent developments in the building of rural telephone lines. It is the result of efforts to reduce the investment required to provide facilities for furnishing high grade service to rural subscribers.

This type of construction has been in experimental use by some of the Bell companies for about a year or less in various localities. One Independent company in Iowa has had such a line in service for more than three years with satisfactory results.

Reports on this new type construction have been so numerous and favorable that it was decided to investigate to obtain first hand information as to its present use and probable future possibilities in the telephone industry. Everyone will agree that the prospect of a better line at a lower cost would certainly be welcome in the rural line field.

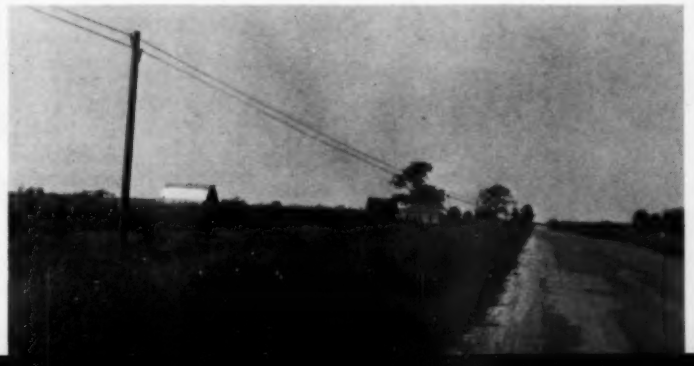
Some claim that the new type buried wire, now in experimental use in some sections of the country, is the answer. In the author's opinion it is still a little early to predict, with any degree of accuracy, its future possibilities from both a service and economic standpoint.

However, the long-span construction with high strength line wire seems to be the immediate answer to at least a part of the difficult rural line problems of the present day. As one experienced telephone man replied when asked for his honest opinion of high strength steel wire: "This wire permits our constructing a line twice as good as formerly and at about one-half the cost." Thus this construction may be a real step forward in the furnishing of adequate rural service at a reasonable cost.

Test Installations in Iowa

When starting out on our investigation a one-mile test installation of this new steel wire which had been in service about one year was located

View to left shows wire tied in the usual manner on regular wooden brackets. This is a pole in a 400-ft. span which is still in perfect condition after 3½ years of service. . . . Below is shown a bracket line of the new high strength steel wire. View to right shows short crossarms which are used in lieu of brackets for supporting high strength steel wire on rural lines. Note that the wire is tied on the outside of insulators to provide extra clearance; gain is cut rather deep to eliminate need for braces on crossarm.



in western Iowa. It is a single metallic circuit on brackets supported by good husky 20-foot poles set in the ground to a depth of four feet. The spans are 350 feet in length. The wire was up in perfect condition, and it was actually difficult to realize that the spans were so long.

Next a test installation consisting of a metallic circuit about two miles in length and supported by small, two-pin crossarms without braces was visited. The poles were husky "twenties" and set four feet in the ground. Longer poles were used on all road crossings. The spans here were only 250 feet in length.

About 100 miles distant was found a line of high strength steel wire, five miles in length, which had been in service for 3½ years. This line had weathered three winters and one severe sleetstorm, without a single case of trouble. The spans are all 400 feet, the longest we have seen on any ordinary telephone line.

This is a metallic circuit supported on wood brackets. The wire was up in perfect condition in all spans and had the appearance of having been strung only the previous day.

These three test installations proved to us conclusively that this new type construction has real possibilities in the future building of good rural lines and thus is worthy of further consideration. Hence all available information has been gathered to pass along to TELEPHONY's readers with the hope it may be used to advantage in the solving of some of their future rural line problems.

The new high strength line wire now available is of two different types. One type is a double galvanized B.B. telephone wire with the same conductivity as the usual B.B., but of high strength. It is similar to the usual B.B. wire except it is not annealed. For .109-in. diameter (No. 12 B.W.G.) requirements are:

Strength 793 pounds (85,000 per sq. in.); 5,800 maximum mile ohm (for standard coating of 0.8 oz. per sq. ft.); 9 twists in 100 diameters; one-half mile coils, each free from factory joints; made from copper-bearing steel, containing not less than 0.20 per cent copper. Heavier coatings of zinc, with correspondingly lower mile ohms, form additional grades. These are 1.6 and 2.4 ozs. per sq. ft., with respective mile ohms of 5,500 and 5,200.

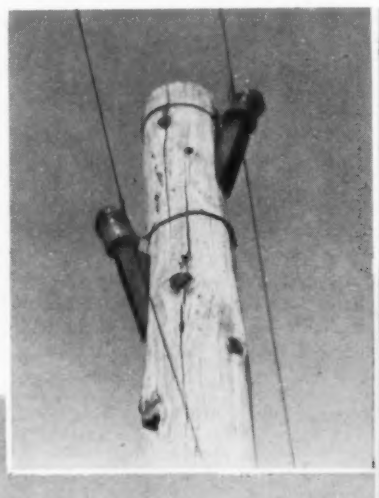
The other type is also furnished in the .109 size. This wire has a breaking strength of 1,213 pounds minimum. The resistance is 75 ohms per loop mile as compared with approximately 70 ohms for the present standard iron wire of equal size.

As far as ordinary rural line uses are concerned it compares quite favorable from a transmission standpoint with the ordinary iron wire. What is meant by this is that the difference in transmission is so slight that it will not ordinarily be noticed by the users. This new wire is available in a zinc coating of 0.8 ounce per square foot.

Limiting values for the tensile strength of the wire are from 130,000 to 166,000 pounds per square inch, based on the diameter after applying the zinc coating. The cross-section of steel in the wire is 0.0087 square inch. The elastic limits may be taken as 55 per cent of the breaking strength of the wire. Other specifications may be used for these new type wires or similar wires, but to date these are the only ones that have been obtained for study.

Insofar as the writer was able to ascertain, there are no long-span rural lines of Copperweld wire in his locality. It is believed, however, that the No. 10, A.W.G. Copperweld wire could be used successfully on this type construction. This wire has an actual diameter of .1019 inch, with a breaking load of 1,130 pounds for the 40 per cent conductivity and 1,231 pounds for the 30 per cent conductivity. The resistance for the 40 per cent is 2.547 ohms and for the 30 per cent 3.396 ohms per 1,000 feet at 68° Fahr.

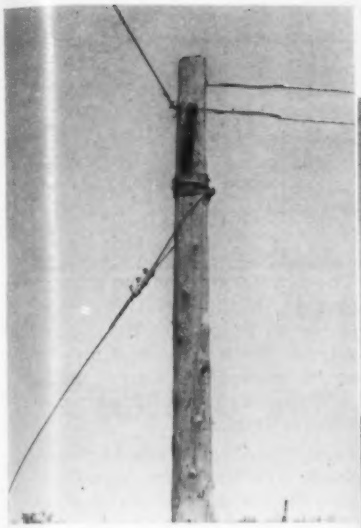
The No. 12, A.W.G., high strength, 40 per cent conductivity Copperweld wire is being used extensively in the construction of numerous forestry telephone lines. These lines are not only subjected to sleet and wind storms but also to falling trees and tree branches. These forestry lines usually traverse remote, unpopulated areas and because of their importance it is desirable that conductors



View to right shows method of wiring wood brackets to pole to provide extra strength on a high strength wire line.

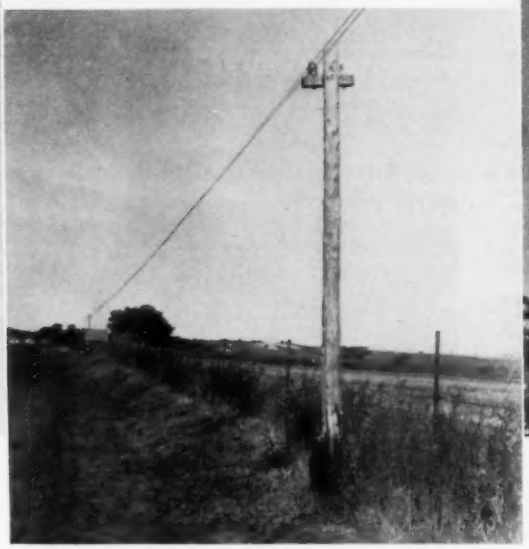
Below is shown another bracket line of new high strength steel wire. Note the length of span, as indicated by the large number of fence posts between telephone poles.

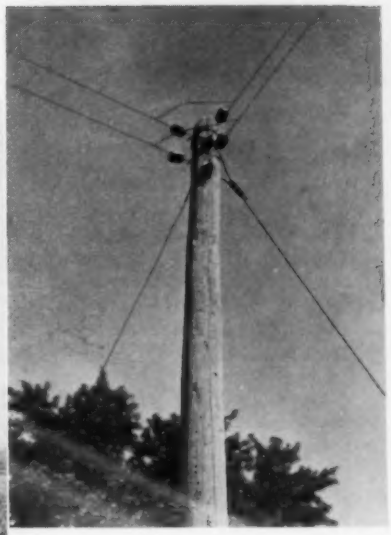
View showing a good, husky, 20-ft. pole set four feet in the ground for supporting new high strength wire.



A dead-end parallel wire for drop and a good stranded wire guy used on a new high strength wire line.

View showing wires transposed on a two-piece insulator on a small crossarm. Arm has pulled slightly downward, showing a brace might have been used to advantage.





New method of turning corner with the aid of strain insulators. Note that this is a much cleaner and better job than with wood brackets.

having high strength and safety be used. Wire meeting these exacting conditions in the U. S. Forestry Service would no doubt provide excellent rural line service in any section of the country.

Line Design Recommended for New Wire

The principal advantage of this new wire for rural line use, as we see it, is that it permits the use of much longer spans and, consequently, a much cheaper line. Some recommend the use of 350-foot spans in heavy-loaded areas and 450-foot spans in medium and light loaded areas. This might all be well in a level country, but in hills it is difficult to always locate a span of this length so as to keep the center clear of the fence or ground.

One exchange manager states that he intends to standardize on 300-foot spans. He said that while they have tried the 400-foot spans and found them entirely satisfactory, they believe that the shorter span proves adequate economy and in some respects makes a better line possible. Also later should it be necessary to use closer spacing of poles, due to an increase in the number of circuits in the lead, a new pole can be set in the center of each span to provide 150 foot spacing.

Even the 300-foot span is extremely long when measured by present standards. This was brought forcibly to our attention when attempting to photograph a section of new construction. On an ordinary line with the usual spacing it is never difficult to show three or four poles fairly well in a photograph. But with the long spacing, even the second pole is so small in the print that it can barely be seen.

We should not care to attempt to twist or serve a splice in this type wire; but by this we do not intend to infer that its splicing is at all difficult. One job was viewed which was spliced with twisted sleeves and others with two different kinds of compression sleeves.

Splicing the High Strength Wire

It was stated that no particular difficulty has been experienced when splicing with ordinary compression sleeves in the usual manner. We understand that one special type of compression sleeve is now available for this new wire and another manufacturer gives assurance that he also will have a special sleeve for the splicing of this wire available in the very near future. So no one need anticipate any splicing difficulties in the use of this wire.

While good poles should always be used on all lines, they are especially necessary on this new type, long-span construction. The majority of companies seem to prefer a 20-foot pole with a 5-inch or 6-inch top. The 25-foot pole has some advantages in certain localities, though it is not an absolute necessity in the majority of cases. One man advised us that he could build a two-circuit, four-wire line, on 20-foot poles set four feet in the ground on 300-foot spans, and maintain ample clearance at all times.

By ample clearance we mean that the low wire in the center of the span shall clear the ground by at least six feet in all cases. Some may be of the opinion that this is not adequate clearance, but if the line is near the fence it should never cause trouble due to being so close to the ground. The shorter the poles, the stronger the line; and this is always a real advantage.

Underground dips or buried wire, under streets, roads, power lines and railroad tracks are now being extensively used in certain sections of the country. When these underground dips are not desirable, higher poles must necessarily be used for crossings.

Thus far in most installations of this new long-span construction, the wire has been supported on ordinary wood brackets. These brackets seem to hold well without loosening when fastened to the poles with 40 and 60 penny spikes.

Providing Adequate Support for the New Wire

Naturally there is an extra heavy strain on the dead-end brackets. This can be successfully handled by using double brackets, or a single bracket with a wire tie around it, nailed to the pole to provide the necessary extra strength. An extra nail at the side of the bracket to help hold the strain is also a big aid in holding the bracket firmly in place. Strain insulators wired to the pole also make an ideal means of dead-ending this type wire.

This method is especially desirable when turning a right angle corner and is, we believe, much neater, cheaper and better than wood brack-

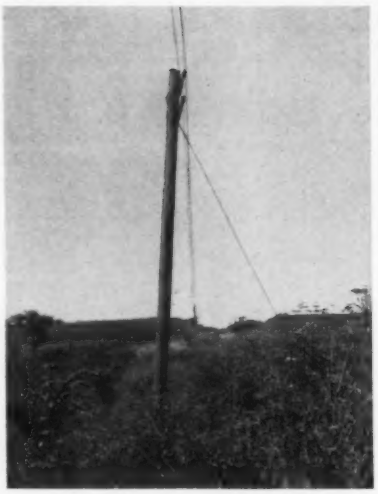
ets. On one of the test installations the wood brackets were wired as well as nailed to the poles to provide extra strength, but in our opinion this is not ordinarily necessary.

The one test installation previously mentioned, where the single metallic circuit was supported on the two-pin crossarm without braces, was a neat arrangement. However, the arm did have a tendency to pull down on the poles where transpositions were located. This could probably be corrected by providing the crossarms on transposition poles with a single brace.

Normally both wires are tied on the outside of the insulators on these poles to provide better clearance. Everything considered, the use of short crossarms makes a much better job than the wood brackets.

Type of Insulators Used in Long Spans

So far as we have been able to determine, this new steel wire can be satisfactorily used on any approved type telephone insulator. All reports indicate that the wire does not require insulator replacement any more often than the regular iron wire strung on the shorter spans.



Pole and guy on a 400-ft. span line. Note extreme long distance to second pole on top of hill; also note small strain on this pole, even though it is well guyed.

One telephone man suggested the use of saddle-groove insulators for this type wire. In our opinion this theory is sound as the wire rests in the groove and the tie only keeps it in place. We would even venture to go a step farther to wonder why some progressive manufacturer does not develop a small angle bracket of iron to support a small saddle groove insulator on a steel pin, the bracket to be attached to the pole with two small fetter drive screws.

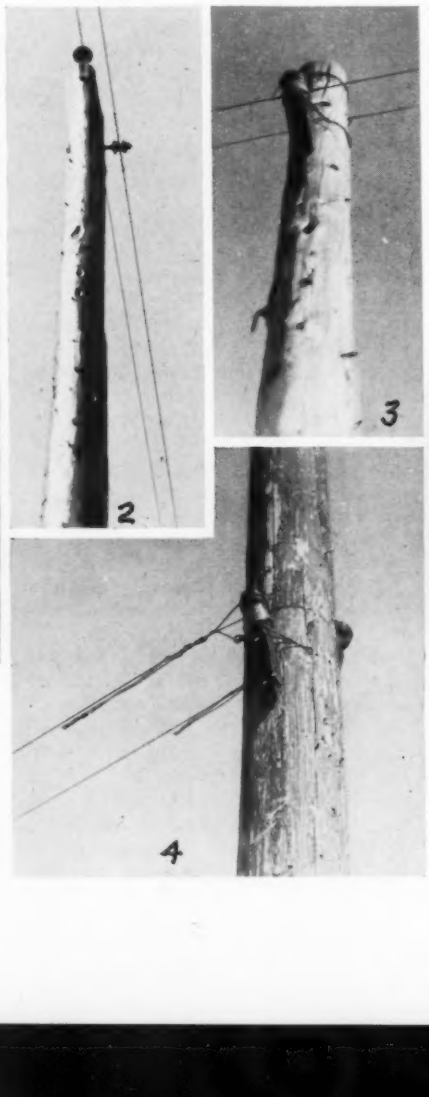
An insulator on a steel pin, mounted by drilling a hole through the poles, as is commonly used on some of the new power lines, might be successfully adapted to telephone use. The ordinary telephone insulator mounted in this position would have all the advantages of the saddle-groove type. Much can sometimes be learned of good construction methods by observing the developments in the power industry.

Certainly the old style wood bracket is obsolete for any type construction, and the method by which it is attached to the poles with ordinary nails cannot be considered the best in modern construction practices. The wood bracket is seldom used these days by the power industry. The suggested new iron bracket of either type could no doubt be manufactured in large quantities at a reasonable cost.

Guys are a most important part in

(*Please turn to page* 43)

1. View showing clearance in center of 350-ft. span with new high strength wire.



2. A fixture recently developed for power use which, it is believed, could be used to advantage with high strength line wire. This fixture would take the place of the saddle groove insulator.

3. Another view showing method of tieing wire to insulator and wiring of bracket to pole for extra strength.

4. Method of anchoring single bracket to pole for extra strength on a dead-end. Note extra nail at bottom of bracket.

5. Protector for buried type of wire for entrance to farmhouse, under a railroad track and power line.

Typical rural pole line construction of the Michigan Bell Telephone Co.: View to left shows Midland rural lead No. 31 on state road M-20 west of Midland, Mich. View to right shows Saginaw rural lead No. 80, approximately two miles south of Gratiot Road.

Rural and Small Office Engineering Problems

By R. FOULKROD
Plant Extension Engineer, Michigan Bell Telephone Co.

REHABILITATION PROGRAM of Michigan Bell plans maximum of eight rural stations per line and engineering design provides high standard of rural service. Experiments with buried rural wire reveal its physical, economical and technical limitations. Long-span rural construction, with high tensile steel wire, is also under test. Program under way for gradual conversion of all small offices to common battery operation. Much good is anticipated as a result of comprehensive program of service improvement in rural areas. Paper presented at Michigan convention

THERE ARE in service in Michigan at the present time approximately 530 telephone central offices serving under 1,000 stations each. About 325 of these are owned and operated by the Independent companies and 207 by the Michigan Bell Telephone Co. These offices, in general, serve the small communities and are located mostly in the rural areas.

The total number of magneto stations served by these offices, together with those served from larger offices, is approximately 105,500, of which 59,000 are rural.

As a matter of interest, the division of ownership of these stations is as follows: 52,000 of the magneto stations and 29,400 of the rural stations are served by connecting companies, and 53,500 of the total magneto, and 29,600 of the rural stations are served by the Michigan Bell Company. The percentage of magneto stations to total stations in the case of the Michigan Bell is approximately 8 per cent.

Of the rural stations served by the Michigan Bell, 25,600 are on a magneto basis and 4,000 are on a common battery basis. It is probable that about the same division applies to the Independent company stations. All of the foregoing figures are mentioned to give a better idea of the magnitude of the problem involved. They are interesting in that they indicate that the division of ownership of rural stations is almost equal between the Independent companies and the Michigan Bell.

Of the 530 central offices serving under 1,000 stations each, 470 are of the magneto type office equipment, representing a decrease of this type of equipment of about 30 offices in the last two years. Prior to 1936, the rate of conversion to common battery service was probably even lower than the average figure of about 3 per cent a year, given above.

Practically all small offices were originally installed on a magneto basis, and in many cases, as indicated by the foregoing figures, this condition has persisted up until the present time for reasons of economy and other factors. The importance of good service in small communities and on rural lines is hard to over-estimate. Good service leads naturally to a greater appreciation and greater use of the facilities.

Comparisons with the volume commonly received on radio today employing, as it does, no wires, may lead our customers to expect, in many cases, a better grade of service on the wire plant than they are now receiving. Particular spots of poor transmission reflect on the telephone company giving the service, and are undesirable from many standpoints.

There are many factors entering into the furnishing of a satisfactory grade of service, and it is the intention of this paper to discuss some of the more important of these factors. While we have been considering for years the problem of small office operation and rural line construction, new impetus has been given to this study in the last several years by new developments, both within and without the telephone field.

If we consider first the problem of engineering rural lines from the outside plant standpoint only, it is

immediately realized that in any consideration of this subject, one of the first questions which must be settled involves the number of stations per line.

Too many stations per line are frequently the cause of subscribers' complaints. After a series of surveys of rural subscribers and an investigation, to a limited extent, of calling rates per station and per line, it was felt that in practically all cases, the maximum number of rural subscribers per line should be limited to eight.

Accordingly, we are following, presently, the practice of building and rehabilitating rural plant for a maximum of eight stations per line, except in cases where there is a definite expectation of growth; and in these cases, a somewhat lower average fill is employed. Engineering plant on this basis necessitates, of course, a fairly accurate estimate of future station development, and our experience indicates that this frequently can be obtained by a canvass of the area to be served.

Certain exceptions to this practice may be warranted under special conditions but, in general, we feel that the objectives mentioned are reasonable ones.

The grade of transmission to be furnished on rural lines is governed, not only by the engineering design, but also by the degree of maintenance. Properly-designed lines, well-maintained, lend themselves to ease of conversation, whether they are common battery or magneto. Realizing this, we are presently designing rural lines to a standard of transmission only slightly below that employed for urban subscribers in the same exchange; and feel it is desirable to so locate the lines clear of trees and other hazards that the maintenance effort to insure a high grade of service will not be excessive.

One of the major supervision problems in magneto offices is concerned with the fact that subscribers frequently do not ring off after completing a conversation, and this naturally has some reaction on the service.

In building rural lines for common battery operation, however, this phase of the supervisory problem becomes more or less automatic, assuming that in the construction of the outside plant, the current limitations on line and supervisory relays in the central office equipment have been carefully considered and the plant engineered in accordance therewith. This sometimes necessitates the use of copper wire where iron or steel wire would be satisfactory from a transmission standpoint and may add somewhat to the cost of construction of the outside plant.

The types of rural outside plant construction usually employed are either cable or open wire, the choice being largely an economic one and depending, to a considerable extent, on the existing development and expected future growth. With reference to open-wire construction, we are now trying out some long-span construction with high tensile strength steel wire which, under conditions favorable to its use, will be less costly than the older type short-span construction.

The Michigan Bell Telephone Co. during 1937 and 1938, has been conducting some trials of buried or "U" type wire for rural lines. Naturally, sufficient time has not elapsed to draw any conclusions as to how this wire will stand up under the service conditions which it will encounter, but the results to date are promising.

In general, "U" wire is not intended to, nor do we think it ever will entirely, supplant open-wire lines. Rather it will be used where conditions permit for plant extensions or to replace deteriorated pole lines which carry one or two pairs of wires.

There are limitations of a physical

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The Rochester community dial office of the Michigan Bell Telephone Co.

The Livonia community dial office is giving satisfactory service to rural subscribers.

Killefer plow used by the Michigan Bell Telephone Co. for burying telephone wire in rural districts where conditions are believed favorable for this type of construction.

Roadside Development; Trees and Pole Lines

By F. C. vonRICHTER, JR.

MANY UTILITIES have learned that the public appreciates their consideration for the preservation of beautiful trees and vegetation. But there still are employes who would climb a tree with spurs, chop out the top of a tree or cut limbs improperly. A plea made before the convention of the Virginia Independent Telephone Association by a representative of the state highway department for educating telephone men to perform better tree service

ALTHOUGH the term "highway beautification" has been universally used by laymen ever since serious consideration was given to the appearance and condition of the roadsides on all highway systems, it is fast becoming obsolete like the horse and buggy and the unsightly pole lines. While it is true that the objective of improved roadsides is beauty, the fact is that beauty is the crowning perfection of that which is useful.

Inasmuch as roadsides replete with natural beauty involve not only the public right of way but in a larger measure the adjacent landscape within sight of the road, it is obvious that cooperative stage development extending over a span of years must take place before the Utopian condition is even approached. During the transition period, it seems far more appropriate to accept the term "roadside development," rather than "roadside beautification."

This is a subject that is vital to the commonwealth. We are both serving the public, both looking ahead, planning for and anticipating a future for Virginia far beyond the conception of the average citizen.

Our acts of today will greatly influence this future, for our mutual concern involves the development of the suburban areas, for homesites—opportunities for the urban population to spread out over a vast countryside and eventually transform the major part of the state into a great metropolitan area. We must accept the highway as our greatest advertising medium and, naturally, the roadsides must produce the alluring influence for tourists and homeseekers.

There still are employes of public utilities who would chop out the top of a tree or climb a tree with spurs, or cut limbs without finishing the cut so that nature can heal the wound.

We have 9,032 miles of primary highways and over 45,000 miles of secondary roads in the state system, which together with several thousand other miles of roads not classified, furnish a total of over 60,000 miles of roads to serve the tourists, either local or foreign, and to welcome the home seekers.

The larger percentage of mileage is on rural roads with minimum width rights of way, which are bordered with beautiful flowering trees and other vegetation. The conservation and protection of this heritage of nature should be paramount in the minds of all who would look to the future prosperity of the Old Dominion, for few states are so wonderfully endowed. Where nature has not been given opportunity to embellish, our duty is to provide a helping hand and give nature an opportunity to re-establish itself.

In both cases, however, our first duty is to promote a naturalistic setting which can be economically maintained, which will promote maximum safety and provide beneficial utilitarian features.

The public furnishes the barometer, or yardstick, for the justification of public expenditures and for utilization of public lands and their environs. Where pole lines are more important than trees and other roadside vegetation in the minds of the public—and particularly the local citizenry—the trees must be sacrificed; and, by the same token, the tree-loving community desiring pole-line service must either sacrifice the pole lines or make adequate provision to take care of both.

It has been proven that trees and pole lines may occupy the same relative area, but these cases usually require compensating influences—the sacrifice of one tree to save several—and the compensating minor change in alignment of poles. Of course, we recognize the fact that the pole-line construction is principally off the state right-of-way, over which we have no control.

However, given this privilege, we welcome the opportunity to call your attention to the fact that the bulk of the public appreciate natural roadsides. They are constantly calling our department to complain or appeal against the seemingly unneces-

sary ruthless cutting of trees along our roads; and our reply is: "We have no control."

From those public utilities companies with whom we have discussed this wanton desecration, we have received very cordial support. They have recognized that it takes decades to grow a tree, but only a few minutes to cut it down and demolish the work of the Creator—for only God can make a tree. They have learned that flowering trees, like dogwood, redbud, sassafras, holly, and a great many of the larger wild shrubs, can easily be retained and kept away from pole lines. They have learned that a large oak or pine or maple can be trimmed so as not to interfere with wires.

They have also learned a greater lesson — that the public appreciates their consideration for the preservation, protection and conservation of Virginia's heritage of beautiful trees and vegetation; and as public servants they have added another notch in their belt of achievements.

"We'll go right there and those trees will have to come out," says this employe. Unfortunately, there are some line engineers who do not study their pole location and readjust alignment to save a tree.

The spirit of appreciation of nature is very contagious and has spread throughout the length and breadth of our land. It is especially pleasing for us to recognize the cooperation you have given us in our appeals.

However, we feel the educational program has not gone the whole way, for still there are employes of public utilities who would chop out the top of a tree, climb a tree with spurs, or cut limbs without finishing the cut so that nature can heal the wound. And some line engineers yet live who would still not study their pole location and re-adjust alignment to save a tree.

Although the directors and higher-ups may be nature-conscious, unless they pass the word down the line—even to the latest recruit—that trees and pole lines have equal right along the highway, they have failed in their duty to their constituents.

Our place is to assist in this campaign and we stand ready at all times to serve you in any way we can. If we can help educate your linemen for better tree service, we are always glad to cooperate.

Ours is not only a program to actually develop the roadsides of Virginia and restore their natural beauty, but to endeavor to influence the property owners and all others having interests along the roadsides to cooperate, in that the Old Dominion may have a worldwide reputation for having ideal roadsides and thereby do our part in making Virginia the best place in which to work and live.

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California Independent Company's Steady Growth

Climaxing a period of steady growth in which installations of new telephones has kept pace with the increasing population of Southern California, the Associated Telephone Co., Ltd., has placed its 100,000th telephone in service, and now serves more individual subscribers than any other Independent telephone company in the United States, it was announced August 23, by Charles F. Mason, president of the company.

"The continued rise in the number of telephone installations is good evidence of the stability and progressiveness of Southern California," President Mason said. "While the rest of the country may have been somewhat in the doldrums, business men here, by their resourcefulness and courage, have continued to push sales graphs higher.

"The record of installations made by our company is considered to be an exceedingly accurate measuring-stick of business conditions generally. And the fact that we have now passed the 100,000 mark, the greatest milestone in our history, after a steady climb made during the past four years is indicative of the continued upward surge of business throughout Southern California."

Operating in Long Beach, Santa Monica, West Los Angeles, San Bernardino, Pomona and 31 other communities in Southern California the company has enjoyed a steadily-increasing demand for service at all points and present indications are that additional gains will be realized for the balance of the year.

The company, at the end of 1937, had a capital investment of over $18,000,000. The steady growth of service requires that every year additions and improvements be made in practically every exchange. This year additions will total about $3,000,000. The company regularly employs more than 900 employes with an annual payroll amounting to $1,400,000.

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Tourist Camp Has Telephone in Every Cabin

The Ethan Allen tourist camps in Brandon, Vt., have telephones in each of 14 cabins, and R. I. Adams, the manager, feels that he is now offering his guests the last word in modern conveniences.

The telephones are connected by underground wires to a cordless PBX located in the office of the camps, and two trunks connect the PBX to the Brandon central office of the New England Telephone & Telegraph Co.

This is the first service connected in cabins on a centralized switchboard of the New England company's system.

Mr. Adams is proud of his new telephone service, and justly so, for his guests are now able to contact the office, receive calls from the office or outside, and place either local or long distance calls without leaving their cabins.

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Bell System Reports Station Gain in August

There was a net gain of 35,200 telephones in service of the principal operating companies in the Bell System during August, compared with a gain of 55,100 telephones in the same month last year. This brings the gain for eight months of 1938 to 163,550 stations, compared with an increase of 606,400 telephones in the 1937 period.

The months of June and July showed losses in stations of 18,000 and 6,850 respectively. Both of these months in 1937 showed gains, that of July being 22,700.

Rural Sales Efforts Productive of Results

By M. R. GRAY
Commercial Superintendent, The United Telephone Co., Clinton, Mo.

RECENT EXPERIENCE in Missouri demonstrates that sales efforts in rural districts are productive of definite results. General picture given of the rural telephone situation with a discussion of problem of unused telephone plant. Accident claims and the piece-meal dismantling of telephone plant by neighbors are some of difficulties in non-removal of unused plant

THE BEST available figures seem to indicate that telephone lines serving farmers have not shared in the general station recovery of the past three years to the extent that small city and metropolitan areas have. Multi-party farm lines that once served 10 to 14 customers each and now serve only a fraction of that number are not uncommon. Many such lines have disappeared altogether.

It is a question whether this condition is temporary or permanent. Nevertheless, the plant, sales and operating problems that it presents are as vital today, for hundreds of small-town telephone companies, as in the depths of the depression.

Neglected Rural Plant Breeds Accident Claims

The reduction in number of subscribers has left numerous unused spurs and dead lines or sections of line, although some lines are just as long and scattered as ever, merely serving fewer customers. On the other hand, to a considerable extent, the farms that formerly had telephone service are still occupied and will presumably some day want service again.

Should unused telephone plant be removed? Should it continue to be maintained to take care of former customers who may want service in the future? Can enough service be sold under present conditions to non-subscriber farmers to justify the sales expense?

A succession of accident claims on dead lines and spurs in rural territory has convinced most telephone men that it is imperative to remove unused plant almost immediately. Here are two typical examples:

Joe Marsh was coming home late from plowing. The walking plow was in the wagon and Joe was standing up to drive. A low wire across the road caught him on the chin, slapped him down into the bed of the wagon and cut his leg on the plowshare. He wasn't badly hurt but he walked around stiff-legged for a while and filed a claim against the telephone company.

The wire was a spur of rural line leading to the farm of a former subscriber who had said he would want service again soon. But at the time of the accident the line was out of use and there was no one to report it down.

Then there was the case of Old Man Jacobs' horse. It must have been a good horse; they always are. It got tangled up in a dead wire which fell across the pasture fence, and while the horse wasn't killed, a considerable part of its cash value was peeled off. The result was that the telephone company discovered that horses, in this age of tractors, are expensive.

Unused Plant Appropriated For Variety of Purposes

Aside from the accident hazard it is not uncommon for some of the more acquisitive and less responsible neighbors to tear up parts of the line for non-telephone uses. At least, our company has reason to suspect that more than a few miles of our erstwhile rural pole line has found its way into division fences, machinery repairs and kitchen stoves, although these suspicions are usually hard to prove against any specific individual.

The removal of unused rural telephone lines may be an operating necessity; but from the standpoint of extending rural telephone service to its one-time universal position, it is nothing short of tragedy. It is one thing to roll up an old line but quite another to string a new one.

Once a rural line is taken up, the chances for reestablishing service become relatively remote. Few companies will build a rural line without strong assurance of adequate and fairly permanent revenue from it. This means no less than three or four substantial customers per mile. The economic condition of farmers who have lost their lines in recent years has not yet greatly improved. A few can always be sold telephone service but usually not enough to justify construction.

The farmer needs communication facilities with the town and the townspeople need this contact with the surrounding farming communities. It is a good general rule that customers will stick to a well-maintained rural line much better than to a poor one; and it is much easier to sell non-subscribers good service than poor service.

Sell Farmers Service Before Line Goes Out

The maintenance of rural lines and telephones is expensive, but the fact is, a working rural line costs very little more to maintain for 12-party line subscribers than for three in a five-mile stretch. Therefore, the proper time to sell rural service is before the line goes out instead of after.

It may be generally admitted that selling telephone service to farmers is desirable, but how to go about it so that the sales expense will not outweigh the returns is something else again.

In town your prospect for telephone service is just around the corner or, at most, a few blocks down the street. He is easy to contact and gets a telephone sales talk thrown at him frequently.

With the farmer it's different. It costs money to make rural sales interviews. In order to make a favorable impression the salesman has to catch his prospect at home, and that means driving. When the salesman

is a troubleman who looks after 75 or 100 miles of rural line besides his town plant, his opportunities to interview any given farm prospect in the ordinary course of his plant work do not come frequently, although he makes numerous sales interviews in a month's time.

The burden of rural sales work necessarily has to fall upon the troubleman at the exchange. He should make sales interviews every week in the neighborhoods where he works. His combination job of keeping the service good and soliciting for new business is bound to have beneficial results in any rural territory.

In the United Telephone Co. of Missouri, in addition to the regular week-to-week effort, at least once each year, we have a "Find Farm Fones" special solicitation. Usually it follows close upon the wheat harvest.

The methods and results this year were typical, the designated dates being July 15 to August 5. Each of the 55 exchanges selected from 6 to 20 of their best farm prospects along existing rural lines, either owned or switched. Prospects to the number of 635 were selected.

Says Mr. Telephone:

"Let Me Work for You"

July 7, 1938

Look What I Can Do

here 'tis — MAN WANTED

Get Work for You

"c'mon hurry!"

Protect You

my, how quick!

Save Time and Money

hello! hello!

Keep You in Touch

fine! now we have a TELEPHONE too!

Add to Your Comfort

The other day one of our subscribers called central and asked for your home. Of course, we were unable to ring you because you are not connected at present.

This is not the first time calls have come for you and it leads us to think that there are quite a few people who want to talk to you or members of your family from time to time.

Everybody depends on the telephone and uses it more or less in this day and age. Those who use the service most seem to make the most money. It is a paying proposition to have a telephone of your own so that you can use it whenever you wish, day or night, and so that you can be sure of receiving all the calls that come in for you.

You undoubtedly have a very good reason why you have not had service recently. Maybe there has been a misunderstanding or some error on the part of the telephone company. If that is the case and there is any way that we can clear it up we would sure like to do it. Will you not come in and talk to us about connecting, or send us word so that we can come out and see you? Why not do it today so that you can start getting the word around that you have a telephone?

Sincerely yours,

Nothing Does So Much for So Little as Your Telephone

One of two letters sent to rural prospects by the United Telephone Co., with the purpose in view of paving the way for a personal interview on the part of local employes.

First, two letters were mailed to each of these prospects, about a week elapsing between each. The letters were prepared by the commercial department but were signed and mailed at the local exchange.

The first letter is reproduced on this page, while the text of the second letter follows:

This is right in the middle of your busiest season, we know, and we don't want to take up much of your time. As a matter of fact, it is because you are busy that we are writing this letter.

There will be times during the next few months when you will have some business with somebody and hardly have time to leave your work to go and hunt him up. Those are times when a telephone really pays dividends. Equally important are the times when someone else will want to call you.

It has been some little time since you had a telephone and maybe you've got used to doing without, just like some of us town folks have had to get along without fried chicken. When it comes to food, fried chicken is hard to beat; and for protection, for saving time and for keeping in touch with people, a telephone is just about the most convenient thing in the world.

To make a long story short, we have missed you and would like to have you back on the line. It doesn't cost very much. The fact is we feel sure you could make enough extra with your telephone during the next few months to pay for it for a year. How about getting together with us on the matter?

Sincerely yours,

These letters were designed to get the farmer to thinking about telephone service and to pave the way for a personal interview on the part of local employes. Approximately 550 such interviews were made in the three weeks' period.

Results from Recent Rural Selling Campaign

The results were: 54 direct sales or 8½ per cent of the listed prospects; 12 sales directly through the letters without the necessity of a follow-up interview; 97 farmers shown on the final reports as "probable fall installations"; 47 additional sales made to farmers during the period representing unsolicited business and farmers interviewed and sold who were not on the mailing lists.

We feel that important missionary work was done toward future development. Our employes became better acquainted with the rural communities they serve. They were able, occasionally, to clear up misunderstandings. Even though unable to make a large percentage of sales, they usually succeeded in starting the prospect to thinking about telephone service and in assuring him that we want him for a customer.

Possibly few of the rural lines to which subscribers were added this year were threatened with immediate removal. Nevertheless, the sales undoubtedly strengthened present subscribers in their determination to hold onto their telephone service. Some of the sales drew attention to needed line repairs, lack of which might have involved future accidents. Finally, each dollar of added revenue will do its share toward paying the cost of rural maintenance.

Systematic Rural Maintenance A Paying Investment

By RAY BLAIN

REDUCTION TO A MINIMUM of trouble trips during winter months, when travel is slow and hazardous, and improved public relations because of greater dependability of rural service will result from an annual inspection and repair of rural plant. Outline of plan for conducting an annual rural line overhaul and preventive maintenance program

ONCE A YEAR at least the average owner will have his automobile checked over and necessary repairs and adjustments made. Experience has taught him that this is always the best and less expensive method of obtaining reliable transportation and to keep it available for instant use at all times. He has also learned that it never pays to run the car until it fails entirely before having accumulated defects corrected.

The same rule may be applied to communication; an annual inspection and repair of rural lines will likewise prove a good investment and insure reliable service at all times.

In cold climates the line trouble usually increases during the winter. Therefore, early fall is generally the best time to make the annual overhaul. The overhaul should be conducted with a view of reducing winter trouble on rural lines to an absolute minimum. This practice will undoubtedly reduce the trouble trips during winter months, when traveling over the country roads may be slow, difficult and dangerous.

It is possible to place rural lines in such good condition that they will go through a severe winter with no increase over the normal average trouble. This is as it should be, for telephone service always reaches its highest value during periods of cold and stormy weather.

The subscriber's regard for the telephone company is never increased if his telephone fails during a severe storm. It is also a great satisfaction to the telephone company to have its lines ride out a severe storm, with little or no trouble.

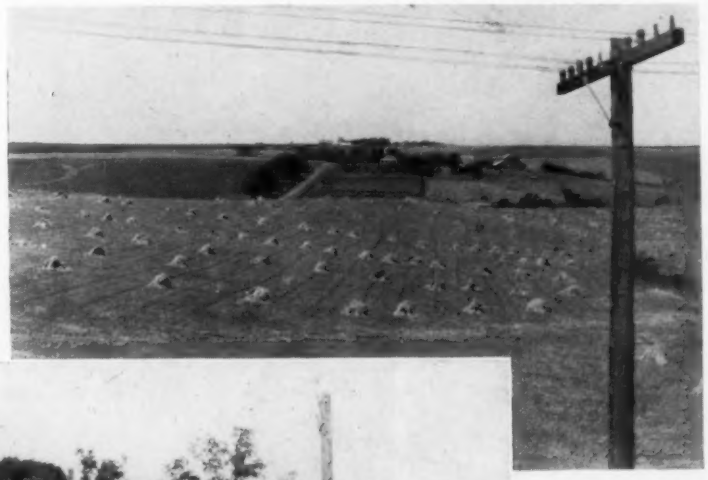
Contrary to general belief, the careful observance of a few simple rules of preventive maintenance will make this trouble-shooter's dream come true. These simple standards will be indicated briefly in describing a method of conducting an annual rural line overhaul. Through this procedure a large amount of the trouble is actually cleared or prevented before it happens.

The poles should receive primary consideration, for we cannot expect to successfully maintain any aerial telephone line without good strong poles. Last winter during the sleet-storm period, in traveling through a certain section of country the sad sight of miles of rural line poles flat in the snow was witnessed.

An examination of many of these poles indicated clearly that practically all had outlived their usefulness and probably exceeded their expected life by many years. The butts at the ground level had virtually rotted away; a simple inspection in the fall would have indicated the defect clearly. Had these weakened poles been reset or replaced at that time, the service interruption would have been avoided, as would have also the greater cost of replacement during a period of cold stormy weather.

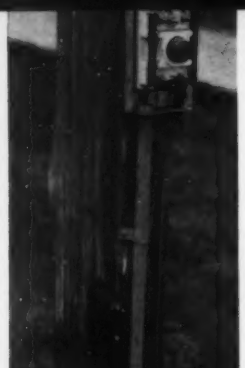
There are various ways in which poles in the line may be tested to accurately prove their worth. Personally the simple method of placing a pike near the top of a pole and then rocking it violently is preferred. This will generally cause a weak pole to snap off at the ground level.

Defective poles should be immediately replaced, reset or stubbed. With the comparatively low cost of good poles at the present time, replacement generally proves the most



A rich agricultural country where telephone service is of value and should be good, though sometimes it is not.

View to left shows a good example of a two-pole corner on a rural line, with guys properly placed and poles raked properly.



Protector with case open used on underground dip. In this case buried wire is used for the underground section.

Small strain insulators used to advantage on right angle corner of a grounded rural line.

This view shows a crowding of brackets and a poor job. The strain insulator arrangement would have proved desirable in this case.

Strain insulators used to good advantage for a branch line to avoid the use of a buck arm.

desirable investment in the long run.

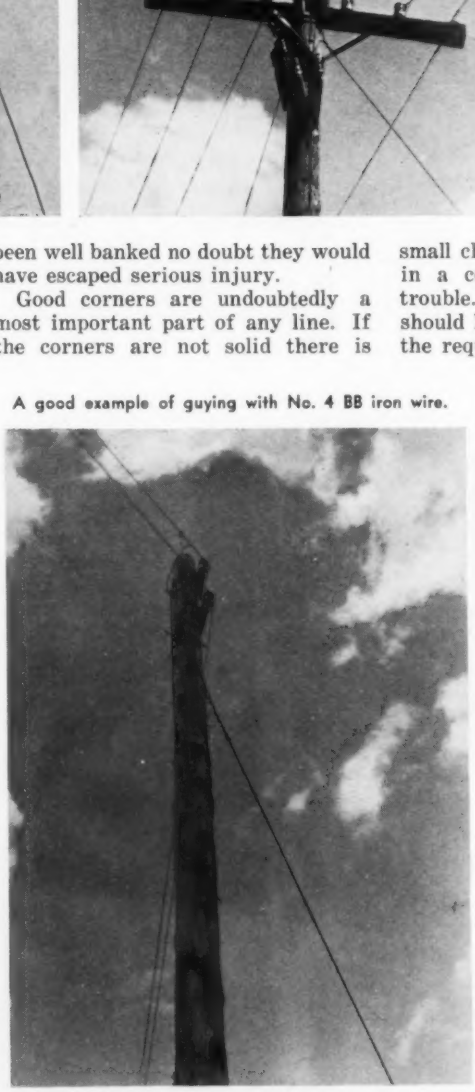
Poles tested and found sound should be lined-up and retamped. A cant-hook can be used to straighten poles which have twisted by the earth settling around their butts. Poles which lean excessively should have some earth dug out on the high side before straightening. After the poles have been tamped-in, we always bank them well with clean earth. Eliminating weeds and grass from around the butts avoids loss by fire.

Some claim, however, that at the present time banking of poles is not necessary and is merely a waste of effort. But only the other day about a mile of good pole line was ruined due to a grass fire. Had these poles been well banked no doubt they would have escaped serious injury.

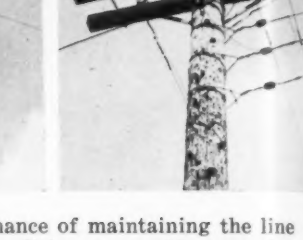
Good corners are undoubtedly a most important part of any line. If the corners are not solid there is small chance of maintaining the line in a condition to avoid excessive trouble. A corner, to hold well, should have a good heavy pole set to the required depth. Never be afraid

Offset arms can often be used to good advantage in tree clearance.

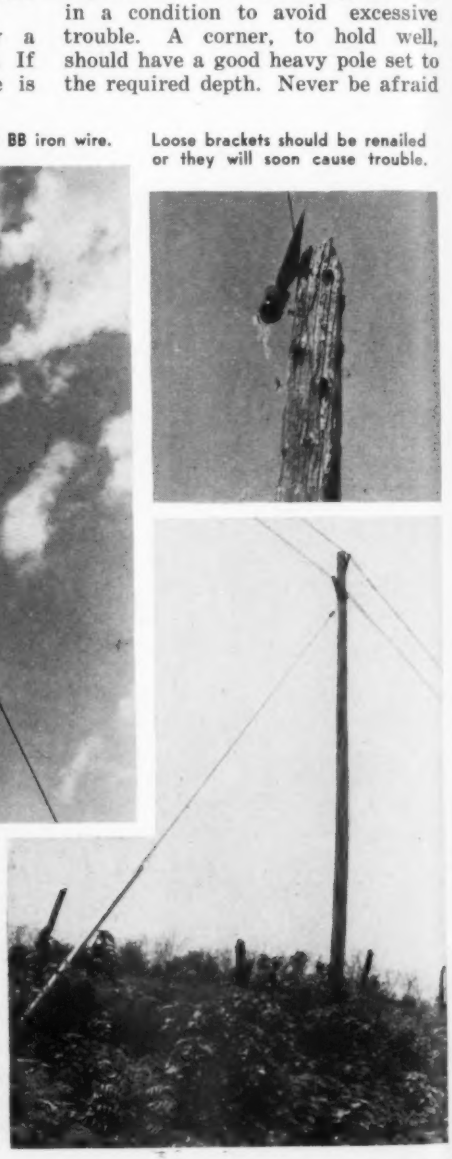
A good example of guying with No. 4 BB iron wire.



Loose brackets should be renailed or they will soon cause trouble.



Often wires are found off the insulators and lying on the pins of the brackets. These represent leaks in wet weather.



A good example of guying a rural telephone line pole using small size strand and small guy clamps. A guy guard was also used in this case.

of setting poles too deep, because depth is a most important factor in causing them to hold the strain.

Some Requirements For Good Corners

The corner poles should also be raked—that is, leaned toward the anchor—which places a part of the load on the bottom of the pole and tends to relieve the strain from the guy.

Occasionally rural line corners are observed without guys. How their builders ever expected them to stand is a mystery; needless to say, they do not stand. All corners, no matter how light, should be guyed or otherwise reinforced. Push braces are sometimes used in place of guys, although they are not in general recommended.

When the pull is light—such as where a drop wire leaves the main lead—the pole may be keyed to replace a guy. This is accomplished by placing a cross-timber against the pole just below the ground level. The pole should also be raked toward the pull.

The anchors should be of an approved type and suited to the particular needs of the line. Patent anchors can now be obtained at a reasonable cost, and there is a type and size for every purpose. It is also a most worthy practice to replace all old, and probably defective, log anchors with new ones of the patent variety.

For guys the use of steel messenger strand is preferred, as it stays put and does not stretch. The small ¼-inch strand is generally adequate for all rural line use. Also preferred is the use of small guy clamps for attaching the strand to the pole and the anchor rod eye. Served guys hold satisfactorily, in most cases, but they are difficult to remove when it is necessary to pull slack out of the guys later.

Some, however, use solid wire for guys with complete satisfaction. For example, one exchange is known where No. 6 steel wire is used, and another manager swears by No. 4 BB iron wire. Both state that their guying needs are adequately cared for by this wire, and this is no doubt true. The material used is not so important if the guys are properly constructed to adequately hold the strain placed on them with a wide margin of safety.

The crossarms or brackets on a corner should always have extra strength. It is a good plan to use double brackets on corners on a bracket circuit, and double crossarms or a two-pole corner on crossarm leads. Some use single wood brackets for corners and then wire them to the pole for extra strength.

A new practice, which seems good, is to use strain insulators on corner poles or junction points to avoid the use of buck-arms. It is also believed that this type insulator has numerous other possibilities which may be developed in the construction of modern rural lines. No doubt much will be heard of this practice in the not far distant future.

Loose brackets are a common source of rural line trouble. This is often due to the fact that nails of too small a size are used in the first place to attach the brackets to the poles. Some construction men use small-size fetter drive screws for attaching brackets to poles and claim complete success. The absence of trouble, due to loose brackets, over a period of years, easily offsets the greater cost of the drive screws over the common variety of nails.

Brackets should always be renailed when found loose on the pole. The nails can either be moved or a larger size used. Loose brackets, or pins swinging on the line, commonly referred to as "floaters," should be removed. A hand line can generally be thrown over the wire to pull these floaters down until they can be reached from the top of the pole.

On the annual overhaul all insulators should be carefully checked for defects. Cracked or chipped glass insulators should always be considered bad and immediately replaced. Good insulators are cheap and it is impossible to maintain good lines without them.

It is a sad, though often common, sight to see numerous insulators missing and the line wires lying on the crossarms or brackets. Frequently the insulators will be in place although the wires are not tied to them. All these contacts of the wires with the pole represent serious leakage in wet weather with a corresponding loss in transmission.

The proper maintenance of line wire is another most important phase in the furnishing of good rural line telephone service. On the overhaul every pole should be climbed, the wire untied and the insulators screwed down tight on the pin or bracket. The wire should be inspected carefully all along the lead and all defective splices removed. Almost invariably the weakest point in a line, and at the same time the one which causes the most trouble, is the defective splice.

One may cover almost any rural line in the country for a few miles and find at least a few splices which are not above suspicion. Old rusty wire should be considered unserviceable and should be replaced. Even small pieces of tie wire should not be left hanging on the line, for they may whirl in the wind and the resulting friction may so weaken the wire that it will soon break.

The replacing of defective splices is not difficult these days nor expensive when the compression type sleeves are used. With these sleeves an old splice can generally be cut out without splicing in a short piece of new wire. The reason for this is that this sleeve uses very little wire in the splice. These sleeves may even be successfully used in the splicing of old rusty wire. However, this should not be so construed as to justify the use or continued use of old rusty wire, for it is only a matter of a very short time until such wire will surely cause serious trouble anyway.

Splicing Line With Barbed Wire an Atrocity

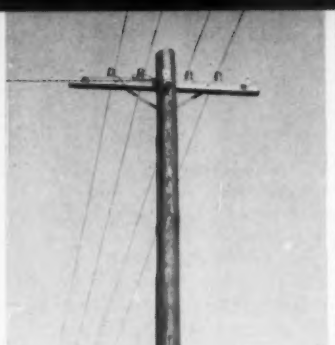
Even in this modern age one will occasionally find wire on a rural line spliced with a piece of barbed fence wire and hooked joints. When this condition exists, the subscribers invariably complain of noise and cut-out trouble. To permit such joints to remain in a line is nothing less than shiftlessness.

After the wire has been untied and splices repaired for a certain distance —say about one-half mile—it should be repulled. Slack blocks and approved type grips should be used for this purpose, for wire just cannot be successfully handled with makeshift equipment.

Care should be taken not to pull the wire too tight, but all wires on the lead should be pulled to equal tension and be level in the span. If good solid corners are provided, the line wire can be pulled to the proper tension with the positive assurance that it will stay there for some time to come.

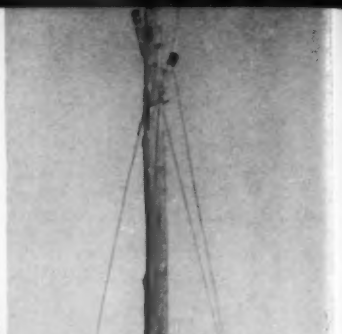
When a section of wire has been pulled it should be retied, using soft wire for the purpose. The line wire should always be placed in the groove so that it will pull against the insulator and not from the insulator and against the tie wire. The approved type ties should be used and extreme care taken not to burn or nick the line wires, even slightly, during the wrapping of the ties.

Broken or rotted crossarms should be removed immediately, for they will cause trouble in a very short time. Loose crossarm braces should



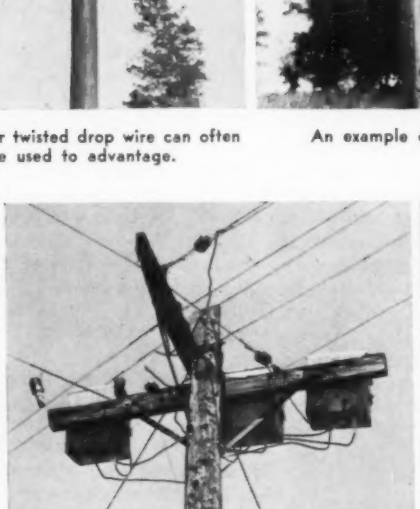
Parallel or twisted drop wire can often be used to advantage.

An example of wrong methods of guying.



A good example of rural line guying.

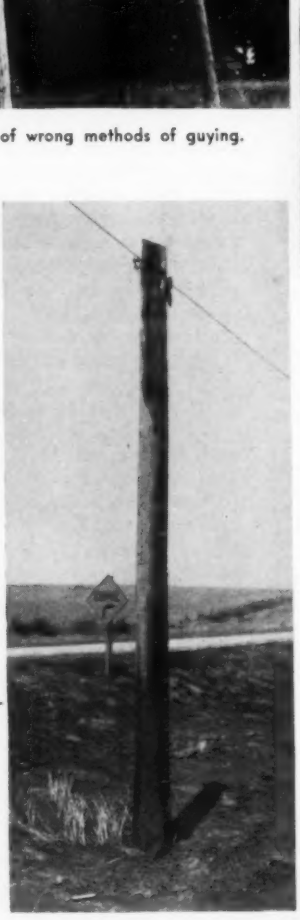
Push braces are sometimes used in place of guys, but they are not in general recommended.



↑Repeating coils and protectors housed in a makeshift shelter will soon cause trouble.

A pole damaged severely by fire during the month of July. This could have been avoided by proper banking.→

A small pole designed to carry two ←grounded lines overloaded when both lines were made metallic.



be lagged back into place. Often the lag screw hole can be plugged with wood and the screw driven back in the same hole in such a manner that it will hold satisfactorily. Through bolts and carriage bolts should be tightened.

Good insulation is necessary for good transmission on any line, and rural lines are no exception. Inspection of many rural lines, however, indicates the need of creating popular opinion for better transmission.

Trees are no doubt the most serious cause of transmission leakage. When it is possible to trim trees so as to clear the line, it should be done without delay. When for any reason trees cannot be trimmed, the erection of lower or higher poles may be justified. Sometimes it may even be necessary to reroute the lead so as to

A telephone monstrosity: Three separate lines along one side of the highway. It is a pity, in such cases, that pin space cannot be rented→ and the two small poles eliminated.

Trees should be trimmed to clear the lines. This tree makes a heavy lead and transmission loss.

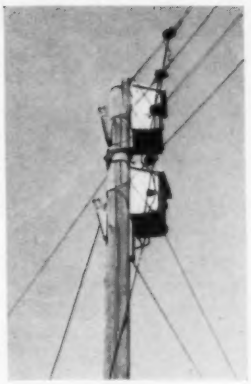
avoid trees which cannot be trimmed or cleared in any other manner. Offset arms are also often useful to provide tree clearance, as with them the wires can be placed nearer the road and away from the trees without moving the poles.

Another practice which is rapidly gaining favor on rural lines is that of stringing twisted pair or parallel drop wire from the line to the house. This seems to be a very good feature as it provides better clearance and a neat all-around job. When open wire is run to the house, it generally has to be left quite slack to avoid humming, for slack is usually responsible for this trouble. The drop wire also provides better clearance and less chance of trouble where it breaks off the main line.

Drop wire may frequently be used to advantage in crossing roads to provide maximum clearance. Approved type drop wire clamps are a real convenience on this work and connection to the main line should preferably be made with the solderless type connectors.

Underground dips for road crossings, power lines and railroads are rapidly increasing in favor for rural line work. This type of construction costs a little more at the beginning but the absence of trouble over a period of years seems to prove it quite desirable.

Pole-mounted protectors can be obtained in a waterproof case, with a short length of conduit extending below the ground level. The present-day improved protectors really make this type of construction possible, for they require very little, if any attention, even after severe electrical storms.



Another example of improper housing of repeating coils.

Single brackets frequently will not hold the strain on a corner. Illustration to right is an example of a corner pole not properly guyed.

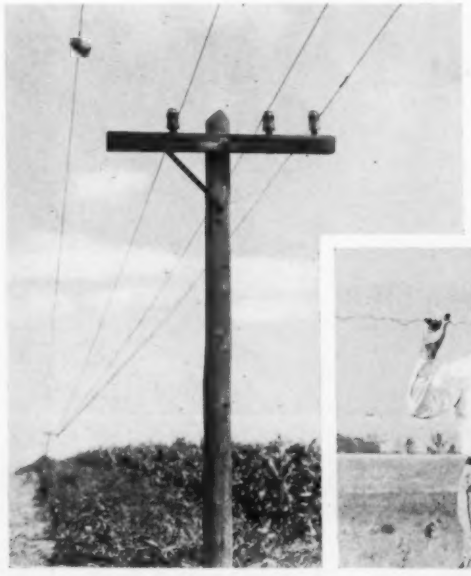
For the underground section, tape-armored cable of one or two pairs, rubber-insulated and lead-covered, is generally used. This is a type of job where the use of the new buried wire can safely be recommended.

Due to rural electrification it has been necessary in many sections of the country to replace grounded lines with metallic circuits. In some cases small poles, barely large enough to support two grounded lines but in no manner suited for the support of the four wires necessary for metallic service, have been in use for years. Despite this some companies have hung two extra wires on these small toothpick poles.

They may reasonably expect trouble on these lines during the winter months, especially in sections of the country where excessive sleet loads must be considered. This trouble may be avoided in some cases by adding a few new poles to the line. Even five good poles to the mile may make a big difference when the extra sleet load is placed on the line.

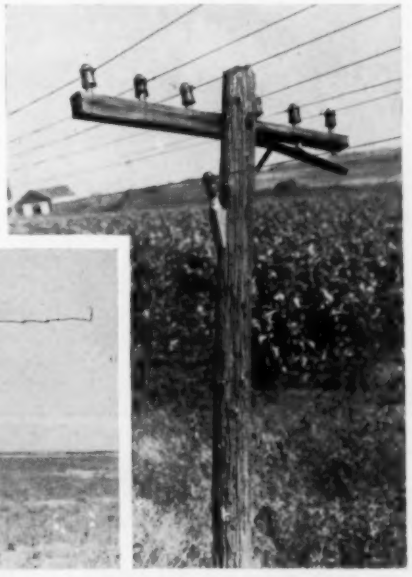
It has also been noted that when sections of grounded lines are metallicized, repeating coils and protectors are often housed in makeshift boxes mounted on the poles. This practice is sure to eventually cause trouble on any line. Good coil housings with protectors can be purchased at a reasonable cost, and for

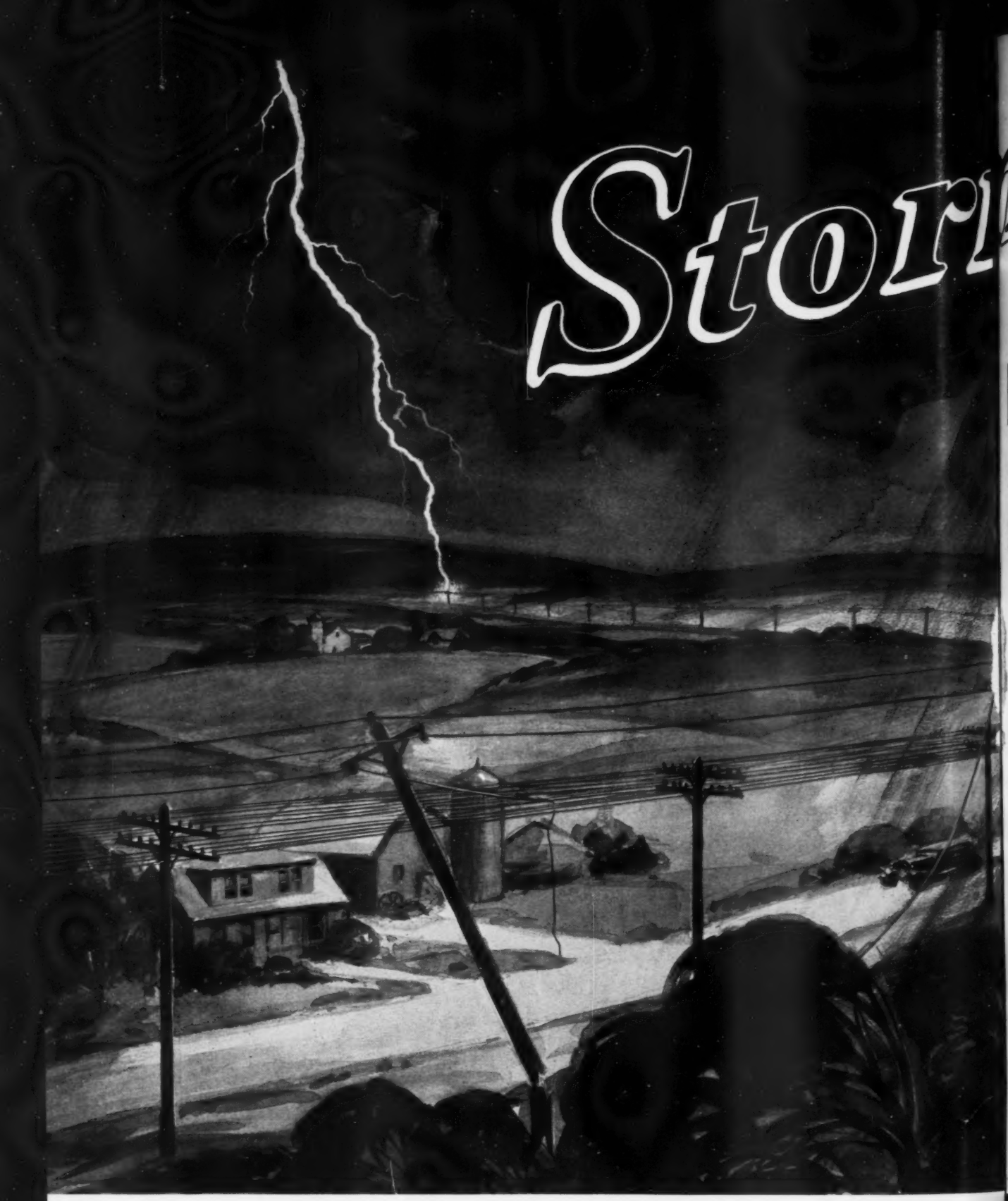
Floaters should be tied down before having a chance to cause trouble.



We often find rural lines spliced with a piece of barbed wire fence wire with hook joints. To permit such connections to remain in service is nothing less than shiftlessness.

Defective crossarms such as this should be replaced immediately.





SANDS DEVICES INCLUDE:

Substation Arresters
Substation Protectors
Unprotected Cable Terminals
Protected Cable Terminals

Building Terminals
Building Terminal Boxes
Arrester Fuses
Discharge Blocks
Arrester Carbons

Junction Boxes
Terminal Blocks
Central Office Protectors
Distributing Frames

ns! Lightning!

POWER LINE CROSSES -

SANDS PROTECTION EQUIPMENT PROVIDES COMPLETE PROTECTION AGAINST THESE DANGERS

In the Type 2105 Discharge Block lies the secret of the better, more complete protection which SANDS protective equipment provides.

This remarkable device represents one of the greatest advances ever made in the science of adequate protection for substation and other telephone equipment. It is a unique and exclusive SANDS development and is furnished as standard equipment on SANDS products only.

Here are some of the outstanding characteristics of the Type 2105 Discharge Block, which will repay careful study:

It is SAFE—since with carbon-to-carbon discharge surfaces, there is no metal to burn away and enlarge the gap beyond safe limits.

It is DEPENDABLE—uniform dependability of operation is assured by our insistence upon unusually close tolerances in its manufacture.

It is AUTOMATIC—grounds the line automatically on currents of ½ ampere or more.

It RESETS ITSELF—automatically, after the current ceases.

It is ECONOMICAL—since its automatic resetting feature eliminates continual inspection, resetting and replacement expense.

It is SELF-CLEANING—of the air gap type and fully enclosed, it cannot fill up with dust and moisture.

It is LONG LIVED—due to high quality porcelain used and carbon-to-carbon discharge surfaces which do not burn away.

Our laboratories have completed a series of exhaustive tests, showing the performance and operation of the Type 2105 Discharge Block as compared with other types. We shall be glad to mail you—free of charge—the details of this investigation upon request. Write for a copy—today!

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all such jobs they will prove a good investment.

It is quite possible that many readers will not agree with this recommended plan of such a complete and thorough overhaul of rural lines. Many will, no doubt, claim it is entirely too expensive and a luxury they just cannot afford. As one manager said: "This rural line business is a ten-cent store proposition and we can't afford to put much money in it." Perhaps if some companies would put more money into their rural lines, they would be able to take some money out of them.

Prospective subscribers are never very anxious to be connected to a line when they know the service is inferior, or fails frequently. Rural line service, to be of value, must above all be reliable. In the city if your telephone fails it is usually a simple matter to use the neighbor's telephone, but in the rural community the neighbor's telephone, generally being on the same line, fails also.

No one will ever be able to convince us that it proves good economy to permit lines to fall down, then purchase materials with the quickest delivery, regardless of cost, in order to restore service with the least possible delay. We firmly believe that repairs should be carefully planned in advance and then these repairs carried out in detail. We also believe that necessary repairs and replacements on all lines should be made at least annually.

There is no doubt that rural line rates should be higher. It is likewise true, in many localities, that the service must be improved considerably before an increase in rates will ever be considered. In this connection the placing of the rural lines in first class condition should in no manner be considered a gamble, but a proved betterment which will most surely pay dividends in the future.

▼ ▼

Television-Telephone Service in Germany

A television-telephone service over cables with repeaters at every 35 km. was opened between Berlin and Munich mid-July by the German Post Office. Faces of people in conversation over the 400 miles or so appeared clearly on a cathode-ray tube screen at each end, but distortion was noticeable, the faces appearing broader and wider and the forehead lower.

Scanning is by mechanical means, a light spot being used. The definition is 180 lines and 25 frames per second, resulting in a certain amount of flicker. The image frequency is impressed on a carrier, and the signal is transmitted after the upper side-band has been surpressed. Styroflex and ceramic insulating disk cables are used. To provide for the 441-line broadcasting television standard it will be necessary to have repeaters at every 17.5 km.

The price of a three-minute conversation is Rm. 4.80, plus Rm. 0.80 for notifying the called person (100 reichspfennigs equal 1 reichsmark, which equals about US$.40). Only one conversation is at present possible at a time. People wishing to speak and see from Berlin to Leipzig or Nuremberg while a Munich-Berlin conversation is taking place, have to wait their turn. The service to Nuremberg and Leipzig has been in operation for some time, and it is proposed to extend the system to Cologne, Hamburg and Frankfurt shortly.

TELEPHONY-RCT Semi-Annual Issue

This issue of TELEPHONY includes the autumn number of Rural Community Telephoning. For those readers who may not remember . . . TELEPHONY and RCT were combined last year. According to the present arrangement, twice each year (in the spring and again in the fall) TELEPHONY'S reading pages are addressed particularly to operators of rural telephone systems.

This issue has a circulation of approximately 11,000 copies . . . 5,000 more than the usual number. TELEPHONY believes that the rural telephone systems represented by this supplementary mailing list are an integral part of the industry and should have the benefit of information and advice about their business such as contained in the various articles published in this issue.

TELEPHONY invites the operators of rural telephone systems who receive this issue to write to any advertiser whose product is of interest to them and to write us (the publishers) telling what they like best about the issue and suggesting subjects they would like covered in future RCT numbers.

▼ ▼

Badly-Burned Boy Lives to Play College Football

Forrest Behm, son of F. E. Behm, assistant plant superintendent of the Lincoln (Neb.) Telephone & Telegraph Co., starred as a linesman in the spring practice of the famous Cornhuskers football team, representing the University of Nebraska where he is a freshman. The 18-year-old youth was the subject of a feature article in the Lincoln Journal newspaper recently because of the fact that at the age of five years he was so badly burned in a grass fire that the doctors gave him up to die; and then when he lived they said nothing could prevent him from being crippled for life.

His father, determined that if possible the boy should walk normally, personally undertook treatments lasting for several months consisting of twice-a-day manipulation of the child's right leg from off which the skin and fatty tissues had been burned. Week after week the father went to bed at 6 o'clock, got up at midnight and for the remainder of the night cared for the boy. It meant hours of screaming agony for the youngster, but he submitted bravely. Today he is 6 feet 4½ inches tall, weighs 204 pounds, is sound physically and was praised for his work as a tackle by coaches and sporting editors.

▼ ▼

Varied Program for Oklahoma District Meeting

H. W. Hubenthal, secretary of the Oklahoma Telephone Association, has announced the tentative program for the district telephone meeting of the association to be held at Broken Arrow, Okla., October 7. The meeting will be under the auspices of the Oklahoma Telephone Co. J. W. Walton, vice-president of the company, will preside.

The tentative program includes:

Morning session: Addresses "My Job is My Hobby—I Like It," by Margaret Mills, cashier-chief operator, Oklahoma Telephone Co., Hominy; "Association Activities," by C. E. Devin, manager, Apache Telephone Co. and president, Oklahoma Telephone Association.

Noonday luncheon: Toastmaster, H. H. Armstrong, division commercial superintendent, Southwestern Bell Telephone Co., Tulsa; address of welcome, by F. S. Hurd, vice-president, Broken Arrow Chamber of Commerce; response, by W. T. Autry, president, Chamber of Commerce and local manager, Oklahoma Telephone Co., Broken Arrow; address, "Editor's Viewpoint of Telephone Service," by Paul Miller, editor, Broken Arrow Ledger, Broke Arrow.

Afternoon session: "Rural Service Problems," by L. M. Baker, district manager, Southwest Telephone Co., Purcell; address (subject unassigned) by Miss Denton, chief operator of the Southwestern Bell Telephone Co., Tulsa; address (subject unassigned) by Joe Nelson, manager, Skiatook-Sperry Telephone Co., Skiatook; inspection of the Oklahoma Telephone Co. exchange.

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In the Nation's Capital

By FRANCIS X. WELCH

Special Washington, D. C., Correspondent for TELEPHONY

PATENT ON ULTRA HIGH frequencies of the radio spectrum, which is expected to extend limits of broadcast television, may be of great interest to telephone men . . . Post of Chief Engineer of FCC grows in importance due to problems of interference with radio broadcast reception . . . Basic rule of public relations, as stated by Vice-President Arthur W. Page of A. T. & T. Co., commands respect because of successful working of Bell System public relations policies; it's just a simple general rule

LAST WEEK, the news came out of Washington that Dr. Vladimir Zworykin had assigned to the Radio Corporation of America, United States Patent No. 2,125,977, which was recently granted to him. The patent covers a device for controlling the erratic conduct of the ultra high frequencies of the radio spectrum.

Under the present state of the radio art, these frequencies act so crazy that it is impossible to broadcast television much over a distance of 25 miles without getting an image on the receiving set comparable to the fat-and-skinny distortions of the Magic Mirrors at a carnival side show.

When the news of the Zworykin patent award and assignment went over the press wires, most newspaper editors read it over and yawned. Interesting but technical—so it was shoved into the inside pages or dropped out altogether. Some publications sensed the true importance.

The Wall Street Journal editorialized upon the matter with intelligent recognition of the significance behind the bare report. Telecommunications Reports covered the news story with clarity, accuracy, and promptness. The two older New York newspapers picked up the item as did the Baltimore Sun, and that was about all there was to it—a passing splash in a news world writhing with politics, war, and criminal trials.

YET, IT MAY or may not surprise you, Mr. Telephone Man, to know that you may have a mighty big interest some day in the field which Dr. Zworykin is exploring. The commercial goal is, of course, to obtain legal priority over the most practical, economical, and efficient method of broadcasting television.

In previous discussion in this department, there has been some description of the existing set-up as between the "wire" industries (telephone and telegraph companies) with their billions of investment literally staked to the ground, and the "wireless" interests who would like to walk all over God's heaven in the exploitation of commercial television for the simple reason that the heaven doesn't charge any toll fees.

Because of the limitations of the ultra high frequencies, already noted, the commercial operating radius of a television broadcasting station would make a circle only 50 miles in diameter. It is exceedingly doubtful if such a service could support itself by commercial sponsorship similar to that which now supports sound broadcasting.

The only known way to break this impasse is by a relay and boosting operation, employing the coaxial cable developed by the Bell. Such a practice would be quite expensive as far as coaxial cable costs now go. Furthermore, it would put most of the high cards in this big game of television right into the hands of the telephone industry.

Small wonder that the wireless radio group has been striving mightily to discover an independent approach to the solution of the problem. Dr. Vladimir Zworykin, already noted for his television developments which include an iconoscope rivaling the Farnsworth developments, has been working diligently on this matter.

It would be most presumptuous for your correspondent to attempt to give more than a very rough idea of how Dr. Zworykin's latest discovery is supposed to work. It seems that the troublesome distortions of the ultra high frequencies employed in television are due to a constant shifting and undulation of those mystic wave insulating strata which surround our terrestrial globe and cause the radio impulses to bounce back towards the earth in disorganized sequence and direction.

Zworykin's apparatus provides for self-synchronizing operation between the transmitter and the receiving set, whereby these frequency variations are automatically corrected. That is what it is supposed to do, at any rate. If it does, it may follow that television can be transmitted over considerably increased distances without the assistance of a coaxial cable or any other land wire agency.

It is too early to know, of course, whether Dr. Zworykin really has something there or not. But it is not too early by any means for telephone men who have an eye on the possibility of vastly increased radio and television line service traffic of tomorrow, to keep a close watch on the results.

Still, the regulatory problem of television would not necessarily be solved even if Dr. Zworykin's self-compensating frequency corrector turns out to be an unqualified success. There would remain an important decision of policy: whether to preempt a large section of the avail-

able radio spectrum for television service with possible displacement of other frequency service, which could in some cases be handled in no other way.

In the final analysis, this decision will have to be based upon the greatest good for the greatest number, or, as the lawyers say, upon "public convenience and necessity." And besides, the Bell Laboratories are still going right along with their knitting. They will not let the radio men run away with the invention honors, that is certain.

AND WHILE on the subject of improving radio frequency reception, telephone and electric equipment manufacturers, as well as radio manufacturers, will probably follow with interest the conference called by FCC Chief Engineer Jett, to be held in Washington on September 19. The ostensible purpose of the conference is to consider proposed regulations designed to govern the operation of low power devices utilizing radio frequency currents. In issuing the invitation to manufacturers to participate, the FCC release states:

> It unquestionably is the desire of all reputable manufacturers to cooperate fully with the commission and thus assure the possibility of full development of radio communications. For this reason, it is felt that the manufacturers of devices which employ radio frequency currents as essential to their operation and which may cause interference to radio communications, will design their apparatus to operate in accordance with rules and regulations promulgated by the commission to maintain communications by radio. To this end, the attached proposed regulations are suggested as a basis for discussion at the meeting to be held on September 19.

The terms of a tentative draft were also included with the announcement. Behind this activity is the growing concern of the FCC, based upon informal complaints, that certain equipment and appliances are being put on the market which are interfering more and more with radio broadcast reception.

Of course, the FCC always has had complaints from radio users, especially those living in apartment houses and congested areas, about static interference from the use of X-ray and diathermic machines, and even such common domestic devices as electric razors, toy trains, and so-called "health lamps."

Congress took due cognizance of the medical diathermic machine, which is definitely in the radio field. But the FCC has heretofore sidestepped the issue of purely electrical

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The four pamphlets listed below will be sent without charge to anyone interested. Check the ones you want:

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appliances. More recently, however, a number of devices have appeared on the market which have put quite a different color on the matter.

One of these is an inside private telephone system for industrial plants, institutions or large estates, which plugs into the regular electric circuit. Another suspect is a popular-priced electric phonograph turntable now on the market which actually broadcasts recorded music through domestic radio receiving sets without any direct wire connection between the two. There are other devices in the general category which have resulted in complaints to the FCC.

WHEN ONE stops to consider the increasing use and variety of electric and radio equipment, it makes one wonder more than ever how the wireless and electrical services of the future are going to get along without more and more conflict. The job of chief engineer at the FCC seems destined to become a most important regulatory post—the Chief of Traffic Police for the American airways.

It is gratifying also to note that the present occupant of that post is not only a qualified technician but a man of tact and good will. Instead of the bureaucratic bullying that has too often marred these unescapable conflicts between industrial technique and governmental regulations, Lt. Jett has taken the path of voluntary cooperation.

Such an attitude reminds this writer of an incident that happened here in Washington about twelve years ago. It was right after a heavy toll of Fourth of July firecracker accidents that an alarming number of lock-jaw cases developed. A high medical official, under the administration of President Coolidge, discovered that a certain ingredient was being used in the fireworks which swarmed with tentanus organisms and caused the lock-jaw complications.

Official indignation ran high at the time, and a certain hot-headed Congressman was all for passing a law requiring all fireworks manufacturers to use a less harmful but more expensive substitute ingredient. But the health officer said: "No, that will only make the fireworks people mad. They will either fight the law or disobey it, and it would be a difficult law to enforce. Let's call in the fireworks people and put the case up to them."

And that is what was done. After the conference, the fireworks manufacturers agreed 100 per cent to leave out the germ-laden ingredient, and their voluntary promise of cooperation was accepted by the government. Cheerful industrial cooperation was thus obtained without a single new sentence being written on the statute books, or a single suit filed in court.

Of course, in the case of the FCC, it is necessary to reduce such industrial agreements to the form of a regulation so that all the manufacturers will know exactly what is expected of them. But the reasonable approach taken by Lt. Jett is comparable with the common sense of that health officer back in the Coolidge days. The trite moral is that you can often get a lot farther with voluntary cooperation than with brick-bats and subpoenas.

Incidentally, and apropos of radio reception, a recent magazine issue tells of an alert little boy in East Rahway, N. J., who has rigged up a copper antenna right under the shadow of Station WOR. With it he catches enough power to supply a lighting system in his playhouse. The same story tells of wire fences and lawn mowers in that neighborhood broadcasting programs by reason of the radial rectifying power of rusty metal placed near a powerful transmitter. So far, FCC hasn't received any complaints about radio interference with the general routine of a quiet neighborhood. But there's always a first time for everything.

NEXT WEEK, the International Management Congress is meeting here in Washington, and among the various papers prepared by leading industrial executives for that meeting will be a discussion on public relations prepared by Vice President Arthur W. Page of the American Telephone & Telegraph Co.

Independent telephone operators will be interested in Mr. Page's article because in it he expresses clearly the distinction which the Bell System has always made between industrial propaganda, which is purely or solely self-seeking in character, and that which attempts to instill in the public a conviction that it is to the mutual advantage of both the public and the utility to give each other a fair break.

There is nothing new, of course, in the fundamental principle which has long been recognized by truly expert advisers in the art of public relations. But because the public relations policies of the Bell System have worked so successfully in comparison with similar efforts by other utility industries in the past, this basic rule commands respect.

CONVENTIONS

The Illinois Telephone Association, Hotel Pere Marquette, Peoria, September 21, 22 and 23.

South Dakota Telephone Association, Mitchell, October 5 and 6.

United States Independent Telephone Association, Hotel Stevens, Chicago, October 18, 19, 20 and 21.

Independent Pioneer Telephone Association of the United States, Hotel Stevens, Chicago, Thursday, October 20.

Virginia Independent Telephone Association, Hotel John Marshall, Richmond. November 3 and 4.

Tennessee Independent Telephone Association, Hermitage Hotel, Nashville, November 14-15.

Kentucky Independent Telephone Association, Brown Hotel, Louisville, November 17-18.

Alabama Independent Telephone Association, Jefferson Davis Hotel, Montgomery, November 28 and 29.

Florida Telephone Association, Hotel Marion, Ocala, December 5 and 6.

To get down to a specific example: the public is not going to be inspired with confidence in a utility which is always harping on not getting a fair deal for itself—when its publicity is devoted exclusively to justifying *its* rate structures, or deploring *its* high tax burdens. The average citizen, if he is interested enough to listen to such argument at all (and the chances are that he won't), is quite likely to ask himself: "All this may be true, but why should *I* worry about their troubles? What do *I* get out of this? I've got troubles enough of my own."

In other words, to apply Mr. Page's basic theory, a utility's public relations policy will succeed to the extent that it convinces the consumer it *is* to his own advantage to give the utility a break; that he *does* have an interest—a vital, personal and pecuniary interest—in the utility's continued welfare.

It's just a simple, general rule, but if utility executives would always test their public relations policies with such a rule, those policies would be more likely to get results. They certainly have for the Bell System.

Another interesting viewpoint expressed by Mr. Page is that Big Business must be a better citizen than Small Business. It is the penalty of size which naturally attracts public attention and suspicion.

*

Wages and Hours Administrator Andrews has appointed Arthur L. Fletcher of North Carolina as assistant administrator in charge of compliance. Mr. Fletcher's old job was Commissioner of Labor in North Carolina. Because the textile industry is the hardest nut Mr. Andrews has to crack in connection with the enforcement of the new Federal Act, it is easy to understand why he wanted the aid of somebody with background in labor conditions around the Tarheel sector.

The biggest problem in applying wages and hours standards to the textile mills will be settling the insistence on the part of mills in the Southern States (chiefly the Carolinas) that they be given preferential treatment over the mills in New England. This matter is likely to keep both Mr. Andrews and Mr. Fletcher quite busy for some time to come.

▼ ▼

Dates Fixed for Fall District Meetings in Ohio

The dates for three fall district meetings have been fixed by directors of the Ohio Independent Telephone Association. The first of the meetings will be held at Ashtabula, October 5, when J. D. Bonnar, general manager of the Ashtabula Telephone Co., and his associates will be hosts to the visiting telephone men from the eastern and northeastern sections of the state who will attend.

This meeting will be followed by one at Bowling Green October 11. On this occasion, William C. Henry, past president of the state association and general manager of the Northern Ohio Telephone Co., will be the host and will show those attending the meeting through the new automatic exchange in that city.

The final district meeting will be held at Eaton, November 2. Ed Morgan, a director of the state association and general superintendent of Ohio United Telephone Co., will act as host.

Frank L. McKinney, secretary and treasurer of the association, announces that important matters affecting the industry will be analyzed and discussed. Among these will be the wages and hours law which is believed not to apply to telephone companies, but will be discussed from the standpoint that its application to the telephone industry would have resulted in disaster for many of the smaller properties charging extremely low rates.

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Rural Construction From Commercial Viewpoint

By R. E. DANIEL

District Manager, United Telephone Companies, Inc., Portland, Ind.

BUILDING lines in rural districts that will pay their way via the commercial route. Paper presented at plant conference held during convention of Indiana Telephone Association

THE WORD "commercial" as applied to telephone lines, we take it, means that the revenue derived from the line will justify the expense of building the line. In other words, an extension to plant—especially in rural sections — must prove itself in and pay its own way via the commercial route.

In our own company (United Telephone Companies, Inc.) all requests for work orders for extensions are prepared by the district manager in the field and submitted to the plant department via the commercial route. In other words, the general commercial superintendent places his O.K. on the proposed extension before turning it over to the plant department. If the plant department receives the data sheets originally prepared by the district manager, it means they are O.K. commercially and a work order is then issued to make the extension.

Generally speaking, United Companies will build one-quarter of a mile of line to gain an additional subscriber. Any one-quarter mile extension or over must be covered by a work order, from the plant department, through the general office. Extensions of one, two, three or four poles are left to the judgment of the district manager. And if the "ability to pay" seems to be satisfactory, the extension is made by a maintenance crew or the plant crew without a work assignment.

An extension of one mile of rural line must of necessity carry four new subscribers. However, they may all be located within the last quarter-mile area.

If a prospective subscriber wishes telephone service and the extension measures over one-quarter mile, the company builds the first quarter mile at no cost to the individual. The remainder of the mileage is in reality a 50-50 proposition; in other words, one-half the cost of the remainder of the line, after the first quarter, must be paid by the subscriber.

A contract with the subscriber covers this arrangement. This contract is usually at the prevailing exchange rates for that particular community, while the "bonus," as we call it, for the fractional part of the line to be paid by the subscriber is usually paid in a lump sum.

However, no two Independent telephone operators figure plant extensions the same way commercially.

In every community in which we operate in Indiana and Ohio, except in communities where there is a loose, sandy soil or muck or quicksand soil we use creosoted yellow pine poles. In localities where there is considerable sand, or muck, we use butt-treated cedar poles. This is due to their larger diameter at the butt and their greater bearing surface against the earth at the ground line.

In building a line we use three size lengths in a Class 10 pole for a bracket line. All gates and highway cross-overs will require 25-foot poles as we maintain an 18-foot road clearance. All poles supporting drop wires, where the service is on the opposite side of the highway from the pole line, will require 25-foot poles. Here we hold the exchange iron wire to the prevailing grade of the line and suspend the drop wire from the top of the pole.

In case we pass a respectable look-

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POLE LINE MATERIAL
A good specification - always!

OLIVER WESTERN UNION PINS MADE TO THE MOST EXACTING SPECIFICATIONS . . . . . .

Oliver Western Union Pins are forged from high carbon, mild open hearth steel and are equipped with the best grade of oak cobs which have been thoroughly boiled in paraffine to exclude all moisture. Available in long shank, short shank and lag screw type.

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OLIVER POLE LINE MATERIALS
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Don't Let Argument Lead to Quarrels

Do your own work, don't indulge in controversies; that's the way to get along. Don't let argument lead to quarrels; if the matter is one you can do something about—do it; if not, wait until you can.—Henry Ford.

ing farmhouse on the way with this line, we set a 25-foot pole, even though we have not sold a telephone at the location. Our theory for this is that some time before the lead has served its days of usefulness, we shall have installed a telephone for an emergency period or for a longer duration. The 25-foot pole in place adds little additional cost at the time the line is built and eliminates the necessity for a later change which is more costly.

Providing there is little underbrush or scrub trees, the larger portion of the line will be constructed of 16-foot Class 10 CYP poles. Elevations requiring clearances of 18 feet we grade up 16, 20 to 25-foot poles. Railroad crossings for bracket lines, we grade up 20, 25, 30 and 40-foot poles.

Our companies use the Western Union type oak bracket exclusively. This bracket extends out farther from the pole, requires a larger nail, stays in place longer, due to its size, and will accommodate any size insulator from a No. 9 pony to a No. 42 toll line insulator with plenty of clearance between the skirt of the insulator and the pole. A 60-d galvanized spike nail is used in the top hole of the bracket and a 60-d galvanized stub nail is used in the lower hole of the bracket.

Anchors for pole lines up to and including a 10-pin lead are ⅝ inch by 6 feet rod with an 8-inch cone anchor. This anchor is of our own design. The anchor hole is dug five feet deep vertically, the cone and rod are installed, one foot of small rocks or loose gravel is tamped in above the cone, the bank of the hole is cut away and the rod bent to conform in a straight line to the top of the pole. The remainder of the anchor hole is filled with the soil which was removed and tamped.

Guy wire for a bracket line is ¼ inch S.M. 1,900 pounds. At the top of the pole we use the customary hardware, guy plate, curved washer, angle thimble-eye bolt. One-bolt guy clamps are used at the rod end as well as at the angle thimble-eye bolt end of the guy wire.

The exchange wire is dead-ended on the bracket. About one inch below the skirt of the insulator a short piece of No. 12 BWG iron wire is looped around the bracket, a 60-d stub nail is then inserted in the wire loop, twisted, and driven in the pole to help support the dead-end strain. We formerly used strain insulators, but abandoned them for insulated fork bolts; both were low in insulating qualities. Within the last three years we have adopted the method of dead-ending just described.

Poles for bracket lines are set 30 to the mile, making a span space of 176 feet. Wire is No. 12 BWG iron BB. An average mile of bracket line will contain 22 class 10 16-foot CYP poles; 4 class 10 20-foot CYP poles and 4 class 10 25-foot CYP poles. The cost of one mile of line, including one "circuit mile" of No. 12 iron wire with brackets, insulators and guying — everything in place—averages $153.80. These figures may be of some benefit in figuring proposed betterments to plant or extensions.

▼

Company Forms 100,000 Mile Club

The story of the organization by the Bell Telephone Co. of Pennsylvania of a new safety honor club, designated as the "Hundred Thousand Mile Club," is related in a two-page feature story in a recent issue of Public Safety. This club was started the first of the year with 486 employes of the company in Pennsylvania and Delaware qualified for membership.

The requirements for this unique honor organization are 10 years of driving experience, without having caused a single accident in 100,000 miles of travel. Collectively, these charter members have driven 50 million miles without an accident.

Twenty groups of these ultra safe drivers met simultaneously in different cities in Pennsylvania and Delaware to form the organization. Linked together by means of a telephone wire hookup, membership certificates and wallets were presented to the 100,000-milers by Philip C. Staples, president of the Pennsylvania Bell company, stationed in Philadelphia.

One of the 20 members who responded to the presentation addresses by Mr. Staples and a number of prominent men engaged in safety promotion, was Charles S. Idell, of Philadelphia, who has driven a company motor vehicle 32 years without a single accident.

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Commission and Court Activities

FCC Rehearing Denied Urbana, Ohio, Company

Holding that the reasons filed for a rehearing failed to meet the requirements of specified rules of practice and procedure, the Federal Communications Commission denied August 30 the petition of the Champaign Telephone Co., Urbana, Ohio, for a rehearing before the commission upon the report and order denying the company's claim for exemption and classifying it as a wire telephone carrier subject to all of the common carrier provisions of the Communications Act of 1934.

"The commission having duly considered the petition for rehearing filed herein," read the order, "together with the reports and orders issued in this proceding, and having carefully considered the entire record in the proceeding—including the transcript of testimony, the exhibits, the examiner's reports and the exception thereto, and the briefs filed herein—and being fully advised in the premises, finds that the matters and things alleged and set forth by the petitioners in its petition, as grounds for a rehearing, fail to comply with, and meet the requirements of, Section 405 of the Act and the provisions of Rule 106.31 of the Rules and Practice and Procedure."

▼ ▼

North Carolina Bell Toll Rates Adjusted

The Southern Bell Telephone & Telegraph Co. was ordered August 19 to reduce its intrastate "long-haul" toll rates and extend base rate areas in Winston-Salem, Greensboro and Charlotte, N. C. Utilities Commissioner Stanley Winborne, who issued the order, estimated that the rate reductions would save customers $75,000, based on their 1937 telephone expenditures.

The new long distance rates will become effective October 1 and the flat rates extended to urban areas on October and November billing dates. The flat rate will be extended to 663 Winston-Salem subscribers, 814 Greensboro subscribers and 70 Charlotte subscribers; 2,079 other customers near these cities will receive reduced mileage rates.

Adjustment in long distance rates, applying to distances of more than 120 miles, provides that overtime charges on person-to-person calls will revert to the lower station-to-station rate after six minutes. At present, the overtime charge reverts to the lower rate after 10 minutes.

The reductions resulted from negotiations conducted during the past year.

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FCC Rate Counsel Resumes Law Practice

Carl I. Wheat, after serving for the past two years as telephone rate counsel for the Federal Communications Commission, in Washington, D. C., resumed the private practice of law September 1, with offices in San Francisco as well as Los Angeles, Calif.

Mr. Wheat was formerly chief counsel for the California Railroad Commission. He also served as public utilities council for the city of Los Angeles.

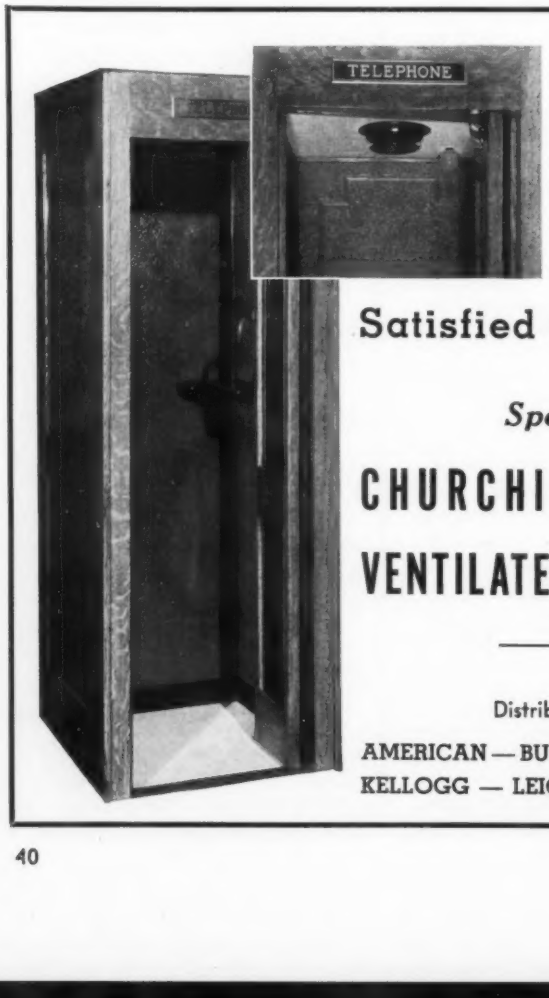
▼ ▼

"Leave Word" and "No Answer" Service

The New York Telephone Co. has filed a revision of its tariff schedules with the New York Public Service Commission which modifies the existing rate for "leave word" service now furnished on a trial basis in Buffalo and introduces also on a trial basis a type of service known as "no answer" service in the Buffalo local service area.

Leave word service includes an arrangement of facilities so that a bureau operated by the telephone company answers all incoming calls to the lines of those subscribers who contract for this service. The bureau receives and delivers messages. The present rate for this service is $2.00 per month and a charge of 10 cents for each intercept period and a charge of 5 cents for each incoming message accepted and transmitted to the subscriber.

At midnight September 10 the two remaining manual offices in Buffalo will be cut over to dial operation which puts the city on a complete dial basis. These cutovers will necessitate some arrangement of facilities for handling leave word service. Dissatisfaction with the



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message and interception features of the present service, together with the inadequacy of the present tariff to produce sufficient revenue to cover the cost of the service, has led to the development of the service arrangement now filed to be effective September 11.

In addition to leave word service the new schedule provides for a supplemental service to be known as "no answer service" for the use of those customers whose requirements do not warrant the complete service. The "no answer service" provides a directory listing indented under the subscriber's regular listing of "if no answer, call Cleveland 9840," which is the number of the leave word service bureau. Anyone securing no answer from the telephone of a subscriber to this service may place a second call as directed and reach the company's bureau.

Based on new estimates of development the monthly cost per customer for leave word service would be $7.81, and for no answer service $3.03. Compared with these costs the new tariff provides for monthly rates of $8.00 and $3.00, respectively. With a greater development the cost per customer would be somewhat less and if the assumed development is not secured, the cost per customer would be somewhat greater.

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Depreciation Rate Set For Bell in Nebraska

Over the protests of the Northwestern Bell Telephone Co. the Nebraska State Railway Commission has ordered the company to set up on its books covering 1938 operations an overall depreciation rate of 3.2 per cent. Commissioner Good wanted the rate placed at 3.18 per cent, but was overruled by his colleagues.

The commission order is based on the reports of the company covering a period of years, and it is contended that it represents the actual charges to depreciation. The company asked for a rate of 4.08 per cent, claiming that the figures used by the commission do not present a complete picture of depreciation results.

▼ ▼

Ignores Commission Authority; Suit Instituted

Acting in behalf of the Michigan Public Utilities Commission, Atty. Gen. Raymond W. Starr filed suit September 2 in the Ingham County Circuit Court at Lansing to collect $7,000 in penalties claimed to be due the state from A. M. Massey, doing business as the Montrose Telephone Co., of Genesee county.

The state charged that Mr. Massey began operation of his telephone system September 25, 1936, without having obtained the approval of the Michigan Public Utilities Commission of conveyances and transfers from the former owners.

He also was alleged to have failed to furnish reports for 1936 and 1937, of failing to furnish reasonably adequate service and facilities, of refusing to appear at a commission hearing and of failure to comply with a commission order directing him to obtain authority for operation of his company and to improve service.

▼ ▼

Summary of Commission Rulings and Hearings

Federal Communications Commission
Washington, D. C.

August 31: Order issued refusing the Champaign Telephone Co., Urbana, Ohio, a rehearing on the FCC report and order denying the company's claim for exemption and classifying it as a wire telephone carrier subject to all of the common carrier provisions of the Communications Act of 1934.

Arkansas State Utilities Commission

September 12: Hearing on application of the Arkansas Associated Telephone Co. for authority to consolidate telephone exchanges at Manila and Leachville, Mississippi county and at Monette, Lake City and Black Oak, in Craighead County.

Illinois Commerce Commission

September 7: Hearing in Springfield on application of the Crossville Telephone Co. for authority to increase rates in Crossville.

September 8: Hearing in Springfield on joint application of the Atwood Mutual Telephone Co. and the Illinois Consolidated Telephone Co. for an order approving and authorizing the sale by the former and purchase by the latter of all of the Atwood company's property; also application of the Illinois Consolidated Telephone Co. for a certificate of convenience and necessity.

September 27: Hearing in Chicago on a petition demanding that utility companies be ordered to withdraw telephone and electric service from gambling places.

Michigan Public Utilities Commission

August 30: Order issued authorizing the Lake City Telephone Co. to issue its notes secured by mortgage for the purpose of improving its telephone plant.

August 30: Order issued authorizing the Lake City Telephone Co. to increase its rates for telephone service to both town and rural subscribers.

September 7: Hearing in Lansing on application of the Michigan Associated Telephone Co. for purchasing certain telephone property.

Minnesota Railroad and Warehouse Commission

August 31: Order issued dismissing without prejudice the petition of H. J. Stolee, manager of the Lutheran Bible Institute, asking that telephone service be furnished the Institute's summer school on Lake Carlos, Douglas county, by the Alexandria Telephone Co.

The commission found that the summer school is located within the exchange area boundaries of the Central

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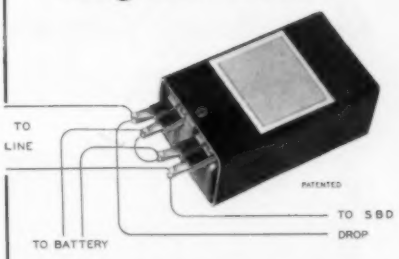

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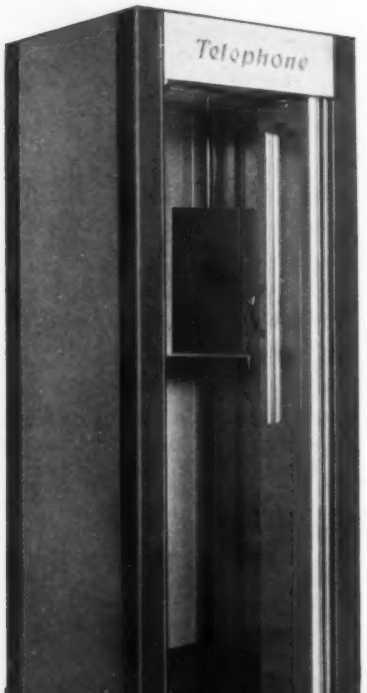

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Telephone Co., of Carlos, which is able and willing to render adequate service to the petitioner.

August 31: Authority granted the Garden Valley Telephone Co. to increase its monthly rates 25 cents in order to establish 24-hour service at its Fertile exchange.

August 31: Authority granted the Garden Valley Telephone Co. to increase rates 25 cents per month at its Bagley exchange upon the installation of common battery equipment, 120 business and residence subscribers having agreed to such increase.

August 31: Order issued authorizing the Central Electric & Telephone Co. to increase its rates at Dawson, effective upon certification by the commission's supervisor of telephones that the company's proposed reconstruction and change in service to common battery has been completed.

Nebraska State Railway Commission

August 29: In the matter of the application of the Lincoln Telephone & Telegraph Co. for authority to increase rates at its reconstructed Weeping Water exchange; hearing set for this date postponed to September 22.

August 31: In the matter of the proper rate for overall depreciation to be set up on the books of the Northwestern Bell Telephone Co. for 1938 operations; Commissioner Good moved that it be fixed at 3.18 per cent; lost; Commissioner Maupin moved that it be fixed at 3.2 per cent which carried; directed that an order be drawn covering subject matter.

August 31: Application filed by Lincoln Telephone & Telegraph Co. for authority to offer optional chime service as a substitute for call bells, carrying an installation charge of $1.00 and a monthly extra rate of 50 cents.

August 31: Application filed by Lincoln Telephone & Telegraph Co. for authority to amend tariffs covering mileage charge for telephone service to permit a charge of 25 cents where distance is 150 feet from base rate area.

August 31: In the matter of the application of the Central Nebraska Telephone Co. for authority to establish a business party rate in the towns of Brady, Grant, Hamlet, Imperial, Keystone, Maxwell, Palisade, Sutherland, and Venango; granted without objection.

August 31: In the matter of the application of the Northwestern Bell Telephone Co. for authority to establish a new rate for dial key 16 to 20 stations; granted without objection.

New York Public Service Commission

September 6: The New York Telephone Co. filed tariff revisions which affect the village of Colonie in the Albany service area, Strykersville in the Java Central office district, and one revision affecting its state-wide service.

The tariff which covers the Albany local service area is being revised to provide for the establishment of locality rates in the village of Colonie and vicinity. The locality rates include, in addition to the Albany base rates, an average mileage charge for three-fourths of a mile for the class of service involved. At present the mileage charges for service within the Colonie area are computed separately for individual subscribers with the result that all subscribers do not pay the same rate. The new revisions will not increase any rate to subscribers, but will result in a decrease in charges to 72 subscribers, each of whom will be notified.

In the Strykersville locality, listed at present in the Java central office district, there are 29 telephone subscribers, all on a rural line basis. Three are served from Java and the remaining 26 from East Aurora. The revised tariffs provide for the inclusion of Strykersville in the East Aurora central office district.

Section 26 of the company's tariff covers temporary service, particularly that furnished to exhibitors at fairs and special occasions of a like nature. At present the tariff provides that where the cost of establishment and disconnection of such temporary service materially exceeds the service connection charge *and the service charges applicable thereto*, special charges in addition to the usual monthly rental for the service will be made.

North Carolina Utilities Commission

August 19: The Southern Bell Telephone & Telegraph Co. was ordered to reduce its intrastate long-haul toll rates and extend base rate areas in Winston-Salem, Greensboro and Charlotte. The new long distance rates will become effective October 1 and the flat rates extended to urban areas on October and November billing dates.

North Dakota Board of Railroad Commissioners

September 13: Hearing in the courthouse in Carrington on application of the Tri-County Electric Cooperative, Inc., of Glenfield, for authority to construct and operate transmission lines for electric energy in the counties of Eddy, Foster and Griggs.

The North Dakota Telephone Association mailed out a letter to its members urging those companies likely to be affected by the electric lines to be present at the hearing and to be prepared to offer evidence as to the extent their lines will be paralleled by the electric line and whether their lines are metallic or grounded.

Ohio Public Utilities Commission

August 29: Certification was made by the secretary of the commission to the mayor of Wren and to the Ohio Associated Telephone Co. on the application of the company to increase its rates in that community as follows:

Business individual, $1.50 to $3.50; business rural, $1.50 to $2.59; residence individual, $1.00 to $2.00; residence rural, $1.25 to $1.75.

The company had submitted a rate base of $30,311.90 and the commission's engineers recommended $28,978.35.

An audit premised on the new rates results in finding an earning equivalent to 1.45 per cent upon the valuation set forth, where under the existing rates the revenue is short 3.77 per cent of providing a proper depreciation charge after paying operating expenses and taxes.

August 31: Authority granted the Northern Ohio Telephone Co. to file a schedule, effective September 1, for the inauguration of automatic service at the Put-in-Bay exchange, including: Business individual line, $4.00 net per month; business five-party, $3.50; residence individual (wall), $2.75; residence

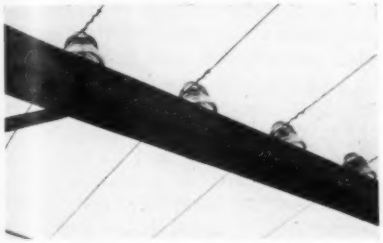
(*Concluded on page* 53)

Long Span Construction on Rural Telephone Lines

(*Continued from page* 18)

the construction of any line if long and faithful service is expected. The guys, however, are doubly important in the construction of the long spans used with the new wire. The long spans place a tremendous strain on the corners which, to hold, must be well guyed.

A suggested practice is to guy a four-wire line as if it were a ten-wire line, and guy one wire as 2½ wires of iron wire with shorter spacing would be guyed. Guys should be



Iron wire ties made somewhat like copper wire ties can be used to advantage on the new high strength steel wire.

designed to carry the load with a wide margin of safety.

When modern materials are utilized, good guying is never difficult and should not be slighted in the least. Poles with even a slight pull should be adequately guyed, if the long spans are to be expected to keep their proper tension in service. Anyone contemplating this new type construction must plan good and adequate guying, or they had better just forget the idea entirely.

Handling the Wire During Installation

One not familiar with the new type wire would naturally suppose that it would be quite "steeley" and difficult to handle, but such is not the case. Actually it is no more difficult to string and handle than the ordinary hard-drawn copper wire, and about the same care should be observed to prevent its injury.

This new steel wire can be successfully tied to the insulators with BB iron wire of the same size. Some use the BB wire to make a tie similar to a copper tie, while others make the conventional iron-wire variety of tie. Both seem to prove equally satisfactory when properly made.

Care should always be exercised not to burn or nick the wire, even slightly during its installation. Approved type wire grips and blocks should be used in the pulling of this wire. The wire should always be well leveled in the span at the time of installation and all be pulled to the proper tension.

One construction man stated that the wire in a 400-foot span was pulled until the slack in the center sighted to midpoint of the wood brackets. In our opinion this is a greater tension than would generally be recommended for ordinary use.

However, this was the 3½-year old line which had withstood the winds of three severe winters and one big sleet storm. Certainly this speaks well for the methods used in its construction. We do believe that this type wire should be pulled to a slightly greater tension than that which it is to be maintained. This is to permit a slight initial settling of the guys and corners.

Probable Future of Rural Line Construction

Rural electrification will doubtless in the next few years force the rebuilding of numerous rural grounded telephone lines in many sections of the country. There is no doubt in our mind that the high strength wire can be used to advantage on much of this work.

The question has been asked as to whether the new high strength line wire can be strung ten wires to the crossarm and advantage still taken of the long spans. This should be possible if good solid corners and exceptionally strong poles are used.

It would, however, be absolutely necessary to double-arm all corner poles and guy exceptionally well. All the wire would have to be pulled to equal tension and be absolutely level in the spans. Then the wires would no doubt all swing together and have little tendency to tangle.

This possibility was mentioned to one manager and he stated that his company intended to place all of its main leads of ten wires or more in underground, tape-armored cable. He believes that over a period of years, with low maintenance and depreciation and with little trouble, it will prove a much better investment than a heavy open-wire lead. Feeders would then extend from this cable, consisting of four-wire leads of the new high strength wire supported on 20-foot poles.

His company also expects to standardize on eight-party, common battery, rural-line service. Certainly this would make an ideal arrangement and one which no doubt in time will place the complicated rural line problem on the right side of the ledger.

This is a brief digest of the information gathered on the new high

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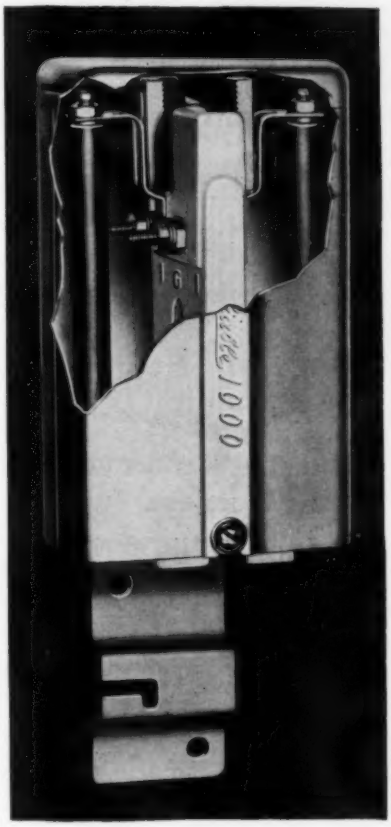

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strength wire and its use in the telephone field. Much of this information has been obtained from first-hand observation of test installations and the opinions of many qualified, telephone construction men. No doubt some of these methods will be changed as future generations find a cheaper and, perhaps, a better way.

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RURAL, SMALL OFFICE ENGINEERING PROBLEMS

(*Continued from page* 20)

character controlling to some extent the use of this wire, these limitations being the type of soil conditions, the possibility of obtaining right-of-way on the highways and other factors. In addition to this, as mentioned previously, there is an economic limitation in that this type of construction does not fit in generally where more than two circuits will be required ultimately. Occasionally, three circuits have been used for comparatively short distances.

As far as we can see, we are going to require open-wire construction for indefinite periods in the future as it is, in many cases, the most economical type of construction as well as the most satisfactory from the service standpoint. Where open-wire lines are used, we cooperate with the state highway department and the rural subscribers to so place these lines that they will be well located, taking into account all of the factors involved.

In addition to the physical and economical limitations placed upon "U" wire—and even assuming that it proves to be entirely satisfactory from the service standpoint—there are technical considerations of considerable importance which limit very definitely the field of usage of underground wire.

A great many of the farm lines in this state are from 10 to 15 miles in length; and, in extreme cases, the last station may be as far as 25 miles from the central office serving it.

From the transmission standpoint, it requires about three miles of .109 iron wire and 20 miles of .104 copper wire to cause as much loss as one mile of "U" wire. Taking into account the distances from the central office of many of the rural stations, it is obvious that "U" wire cannot be used in all cases, other conditions permitting, and still meet satisfactory transmission standards.

Summing up the probable effects of all of these considerations, it is our opinion that the rural plant of the future will contain considerable amounts of cable and open-wire lines with the "U" type wire used largely for the outer ends of the rural lines and for very light leads where physical, economic and transmission conditions permit.

Central Office Equipment Problems

Turning for a moment to the central office equipment problem in connection with small office and rural line engineering, we find that this phase divides itself naturally into four subdivisions: (1) Large dial offices, (2) manual common battery offices, (3) community dial offices and (4) magneto offices.

All large dial offices of the Michigan Bell company now operating in the state, with the exception of four, have the rural lines handled from the DSA board on a manual magneto basis. The remaining four offices supply dial common battery service on all rural lines, and this service has proven very satisfactory. Equipment is now being installed to convert the rural lines in Flint to dial common battery operation the latter part of this year.

In most of the manual common battery offices installed up to the latter part of 1937, rural lines were handled on a manual magneto basis. However, on manual common battery offices installed within the last nine months, we have arranged for common battery operation of the rural lines.

Community dial offices of various types are being used throughout the state, both by the Independent companies and by ourselves. While I am not familiar with the operation of the rural lines from such offices in the Independent territory, I assume that it is the same as ours; that is, they are operated on a dial common battery basis. Our experience to date indicates that this service is very satisfactory to our rural customers.

Magneto offices, as mentioned before, have been with us from the beginning, but it appears highly improbable that any will be installed in the future except in special cases or for very short periods to meet highly specialized operating conditions.

The conversion of rural lines to common battery service removes any problem of station equipment since types of apparatus available in urban centers, with few exceptions, can then be employed on the rural lines.

Common battery operation also lends itself to the application of improved ringing methods on rural lines and frequently results in reducing materially the number of rings per subscriber's station.

One of the special problems which we will encounter, particularly in connection with the installation of community dial offices, is the one having to do with service company lines.

We all understand the definition of a service company, it being an organization which has built its own outside plant, has either purchased or leased its station apparatus, and depends upon some other company for switching. This means that the company which does the switching has very little control over the type of construction used in the outside plant and practically none over the maintenance methods and effort expended.

The inevitable result is that many of these lines are in such condition that satisfactory service cannot be rendered over them; and customers of the switching company, or of other companies, calling these stations and not realizing the conditions existing, are prone to lay the blame upon the shoulders of the company doing the switching. This reacts, to a certain extent, upon that company and upon its service in general.

Just what the solution of this problem may ultimately be it is difficult to foretell at the present time, but it appears it is one which must be solved in many small exchanges

HABIT-HEDGED-IN

By MISS ANNE BARNES

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

ARE YOU habit-hedged-in? Do you dodge behind a habit-hedged-in mind whenever a change is suggested, whether it be of minor or major importance, and refuse to come out from under cover until mayhap you are forced out because of universal acceptance of such a change by others?

Such a person was Hetty Stone. At one remote time the Hocum exchange, in which she was an operator, handled its long distance calls on a toll center basis. The board was very busy due to its free service, toll and local, and Hetty's antiquated methods made the service slow and jerky.

I well remember my first visit to the Hocum office. Hetty told me, between whoops, hollers, and cord jerkings, to make myself at home; also that she would have very little time to give me—as I could see for myself.

"Help me get that Bell dope filed," she said in one of the traffic lulls; "that pile of supplementary pages on a chair in the closet." It had lain there for months, I soon found out.

Hetty called the supplementary matter pertaining to changes, etc., "Bell dope." But when, in the course of time, the toll company, through a rearrangement of its circuits, placed Hocum on a tributary basis, Hetty said the toll company had not appreciated all her efforts; in fact, she felt so injured that she did not remain in the service much longer.

Now this all happened many years ago, but if it had not been for Hetty's habit-hedged-in mind she might have learned many things and prepared herself for the time her company sold its property to the toll company.

I met her a year or two ago, and she told me the traffic she had once handled alone on a toll-center basis now required two other operators to handle it on a tributary basis. She also said the subscribers seemed to like the new order of things better than her almost individual service to one and all.

As we are the best of friends and she is happily located as a clerk in a bank, I thought she might accept a bit of timely advice, so I said: "Hetty, you would not be holding this responsible position if you had not always been capable of improving your work. You lacked proper training in those days of your telephone experience. Times have changed and with them customs have changed. My advice to you is keep on the open road of progress and, remember, the surest way to stay on it is to keep your mind from becoming *habit-hedged-in.*"

Change Your Wall Sets Into Modern Handset Telephones

—With This $8.25 Unit

Earn extra revenue and meet the demand for handsets by using Leich Magneto Handset Replacement Units. Each unit consists of one Leich Handset with cords trimmed as shown; one receiver saddle to fit all makes of switchhooks; and one nicely-finished black metal plate to cover the old transmitter opening (not illustrated).

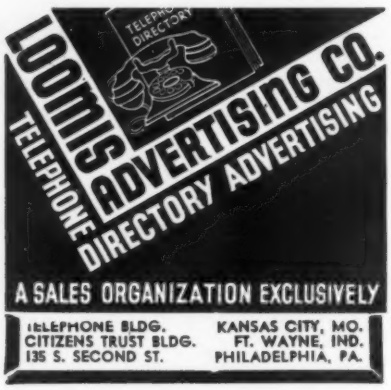
Can be installed without disturbing the telephone installation. No soldering—no rewiring is necessary. Thousands of these units are in daily service everywhere. Try them—You'll like them.

Order
No. 2-A Handset Replacement Unit
$8.25—Complete

LEICH
SALES CORPORATION
222 W. Adams St., Chicago
See The Redbook of the Industry
For All Construction and Supply Needs

before completely satisfactory service can be given.

Some assistance to the service company in the form of helpful supervision in repairs in their plant may, in many cases, be of considerable aid. In any event, it appears to us very definitely that our attitude should be one of offering all reasonable assistance to these companies in an effort to improve the overall grade of service rendered.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TELEPHONE DIRECTORY ADVERTISING CO.
A SALES ORGANIZATION EXCLUSIVELY
TELEPHONE BLDG. CITIZENS TRUST BLDG. 135 S. SECOND ST.
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Consulting Telephone Engineer
"Modernization of Equipment and Methods for Improved Service"
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Electrical and Mechanical ENGINEERS
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Telephone Engineers
Specialists in Appraisals, Rate Surveys, Financial Investigations, Organization, and Operation of Telephone Companies
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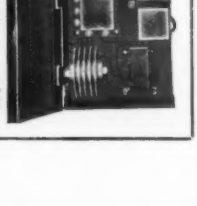
COFFEY SYSTEM
Exclusive Telephone Accountants
Systems Installed
Audits and Special Services
CENTRAL ACCOUNTING DEPARTMENT
Lemcke Bldg., Indianapolis

NOW—ELECTROX Current Supply Unit for operator's sets at a new low price — $14.85. No batteries needed.
Sent on Trial
Schauer Machine Co.
2060-2068 Reading Road
Cincinnati, Ohio


Seasonal service on rural lines is one which reflects primarily upon the "fill" and that, in turn, upon the service. It appears difficult to justify building lines for low fills for subscribers using them for a maximum of six months in the year, and this may be one of the special cases where line fills as low as eight should be increased somewhat.

Community dial offices necessitate that manual equipment be available at control centers in order to handle the assistance calls and the toll calls from the unattended dial offices. With the necessity for manual equipment at the control center to handle assistance and toll traffic, it has been the practice to handle local service for the community at the control center on a manual basis.

It is, of course, appreciated that this practice will vary with the size of the office, calling rate, amount of toll and assistance calls; and it is possible that other solutions might be worked out in some localities.

Financial Aspects

While our experience to date has been limited, studies have indicated that the overall financial results of converting magneto offices to common battery operation should be reasonably satisfactory.

From the standpoint of investments, complete new central office equipment is usually involved together with more or less rehabilitation of the outside plant. Replacement of the existing magneto station equipment is also involved. There is also the cost of arranging trunks at the master office to operate with the new equipment at the community dial office. In total these costs will represent an appreciable outlay of new capital.

The investment per station may or may not be changed, depending on the present investment in plant which will be displaced and the amount of outside plant work chargeable to the capital accounts. It may be expected that the investment in central office equipment will be decreased. On the other hand, the investment in station equipment should be decreased. In the outside plant, cheaper types of construction, mentioned previously, may tend to minimize the net additions.

Charges to the maintenance accounts are incurred in rehabilitating the outside plant and the station wiring, in station instrument changes, and in expenses of an unusual nature usually associated with the cutover of the new office. While these may be relatively heavy in a particular year, depending somewhat on the number of offices converted, they are not recurring costs.

From the standpoint of annual costs, it is our judgment, based on numerous studies of individual cases, that these will not differ materially from present costs under magneto operation. Looking ahead, it is expected that with increased business, the showing as to net earnings in the small offices, will improve as compared with continued magneto operation.

Considered from the viewpoint of service and public approval, as well as from that of company operations, it is felt that much good will result in carrying forward a program of improvements in small offices and in rural lines.

▼ ▼

Telephones in Trailer at Ohio State Fair

For the first time in the history of Ohio, telephones installed in an automobile trailer were introduced at the 88th annual Ohio State Fair, held in Columbus August 27 to September 2, for the convenience of officials and visitors attending the fair.

The trailer was equipped with three public telephones and a switchboard in charge of an operator for facilitating calls to and from the fairgrounds. Not only were the telephones used for many calls within the city, but a large number of long distance calls were recorded.

The telephone booth trailer is similar to that introduced by the Chesapeake & Potomac Telephone Co. at an automobile show in Baltimore, Md., last fall (TELEPHONY of March 5, 1938).

POLES

B. J. Carney & Co., 100 N. 7th St., Minneapolis, Minn.—Western red cedar poles. Fentrex Butt Treated or Plain.

International Creosoting and Construction Co., Galveston, Texas.—Creosoted Southern Yellow Pine Poles. Plants: Beaumont and Texarkana, Texas.

MacGillis & Gibbs Company, Milwaukee, Wis.—Northern White and Western Red Cedar Poles. Plain or butt-treated. Immediate quotations on request.

T. M. Partridge Lumber Co., Minneapolis, Minn.—Northern White—Western Red Cedar Poles. Plain or butt-treated.

Valentine Clark Corporation, 2516 Doswell Ave., St. Paul, Minn.—Finishd Cedar Poles. Plain or butt-treated.

The Manufacturers' Department

New Duplex Light for Maintenance Service

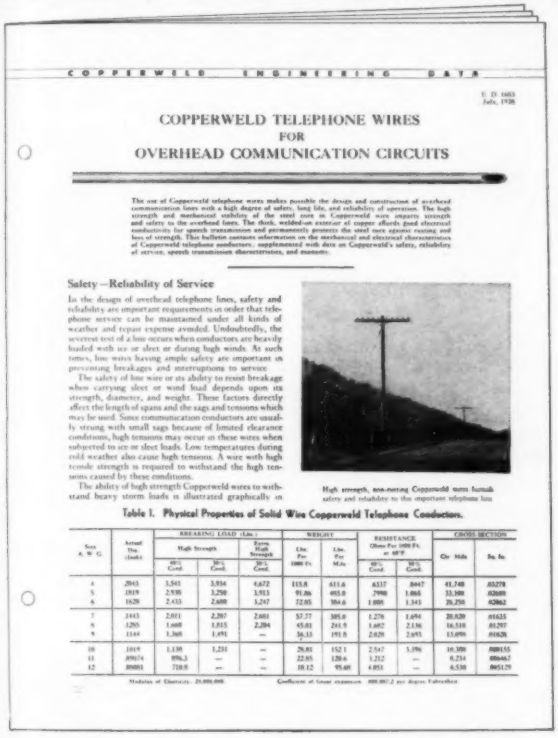
The Carpenter Mfg. Co., Cambridge, Mass., has placed on the market a new portable combination search and flood light specially useful in telephone and telegraph line maintenance. It is classed as type "T & T," weighs but 7.5 pounds; is equipped with a parabolic reflector projecting a 25,000-cp. beam up to one-fourth mile, and is particularly adapted to crossarm illumination in a 10-foot diameter circle up to 40 feet from the ground; it also has a spreading type floodlight reflector for work at the ground level over an area 20 feet in diameter. A single two-way toggle switch throws either lighting unit into service or maintains an open circuit when in the neutral position.

The parabolic reflector is triple silver-plated, and the floodlighting reflector is of exceptionally high quality. The lenses are of shatter-proof glass, and the rims are of shock-proof rubber extending well beyond the lenses. The searchlight can be turned up or down at any angle. Case and bracket are of No. 20-gauge, rust-proof, heavy enameled steel. Current is supplied by two No. 6 telephone type dry cells. The unit is only 10 inches high overall, and is of rugged construction for service in the field.

▼ ▼

Informational Bulletin on Copperweld Wire

An eight-page data pamphlet has recently been published by the Copperweld Steel Co., Glassport, Pa., which is of particular interest to operators of rural lines. It is entitled "Copperweld Telephone Wires for Overhead Communication Circuits" and information is presented in it concerning the mechanical and electrical characteristics of Copperweld telephone conductors.



COPPERWELD ENGINEERING DATA

COPPERWELD TELEPHONE WIRES FOR OVERHEAD COMMUNICATION CIRCUITS

Safety—Reliability of Service

Table I. Physical Properties of Solid Wire Copperweld Telephone Conductors.

Page arrangement of new bulletin of Copperweld Steel Co. giving information and data concerning Copperweld wire for communication purposes.

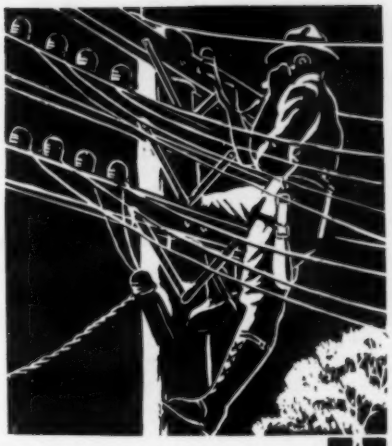
Illustrations are given of telephone lines of various types showing use of Copperweld wire, including long span rural lines. Tables and charts show physical and transmission characteristics of Copperweld telephone wire and also amount of storm load various wires will carry under identical conditions and when installed on wood poles in accordance with usual construction practice.

The splicing of Copperweld telephone wires is shown together with illustrations of the method of tying wires to insulators. Data is presented relating to Copperweld three-wire stranded conductors for special long line telephone circuits such as installed in connection with power transmission lines.

▼ ▼

New Exchange Building at Weeping Water, Neb.

A new exchange building was recently completed by The Lincoln Telephone & Telegraph Co. at Weeping Water, Neb., the new structure being 22 feet



"Say, Tom, have you noticed how few service complaints we've been getting since we been replacing all those old drops with that new Ironite wire? I never thot there was any difference in drop wire till we started usin' this Ironite. Yes, I agree with you it's sure the berries. I'm glad the office is gettin' it exclusive now for it saves a lot of trouble shooting and makes the service better."

IRONITE

the modern drop wire—is certainly most economical.

First—it costs from 20% to 30% less than copperclad or bronze yet its conductivity and strength are equal.

Second—The "armorplate" mica finished braid on the parallel or twisted pair is so tough and hard that it beats anything else in resisting wear on trees, posts, etc.

Third—Ironite's 30% pure rubber insulation prevents current loss 10 times more than most requirements. This saves batteries and generators and improves the signals.

Fourth—The tough pure iron core—double galvanized—resists crystallization of wind sway and so holds up under extreme sleet loads.

Fifth—Splices as solid as a weld and works as easy as copper.

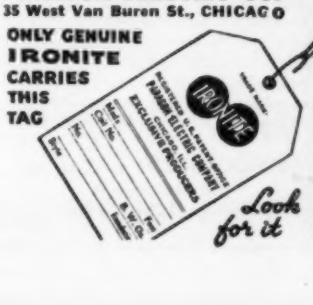
Altogether it pays any company — large or small — to avoid imitations and specify and insist on

GENUINE IRONITE DROP WIRE

Write for special quotations on quantity contracts

PARAGON ELECTRIC CO.
35 West Van Buren St., CHICAGO

ONLY GENUINE IRONITE CARRIES THIS TAG

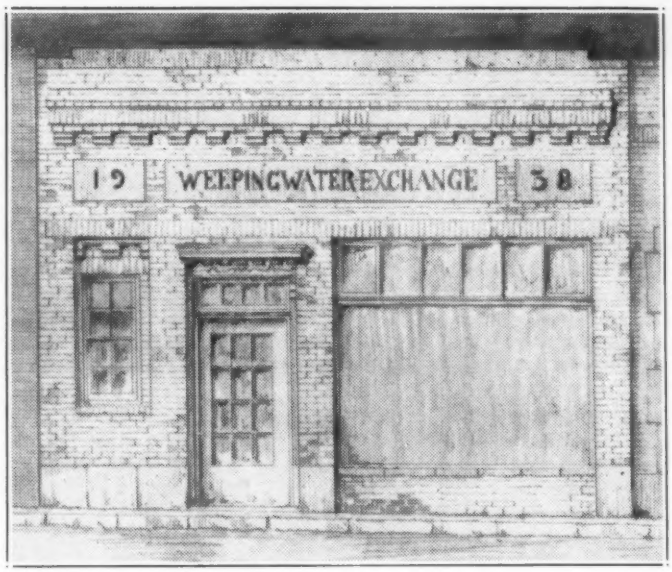


wide and 40 feet long, one-story high and of brick construction. It will house all the company's activities in that city, including the commercial office, now located in temporary quarters across the street from the new building.

Work is now under way on the installation of a new two-position common battery switchboard. The new board is of Stromberg-Carlson manufacture and will incorporate such service features as flashing recall and audible ringing tone. The latest type of distributing frames, testing and power equipment and repeater equipment for the toll lines will be installed. Officials of the Lincoln company expected the new central office to be in service by September 1.

Included among the features of the new exchange building is an adequate customer's room and a fine basement which can be entered by trucks over a driveway leading from the alley.

This new structure replaces the one destroyed by fire last January 22 when flames wiped out an entire business block in the town of Weeping Water.



New building of Lincoln Telephone & Telegraph Co. in Weeping Water, Neb., which will house all company activities in that city.

▼ ▼

New Ringing Machine For Party Line Service

A new type ringing machine has been developed and placed on the market by the Holtzer-Cabot Electric Co., of Boston, Mass., and Chicago, to meet the demand for a source of ringing current supply for harmonic party line installations requiring the minimum of attention at the exchange and at the subscribers' telephones.

In harmonic party-line installations it is essential to have the ringing current constantly in frequency and to approach a sine wave, as nearly as possible. This new four-frequency motor generator was designed by the Holtzer-Cabot company to embody these important features. It is claimed that for economy, simplicity and ability to run for long periods without attention, this new motor-generator is unsurpassed.

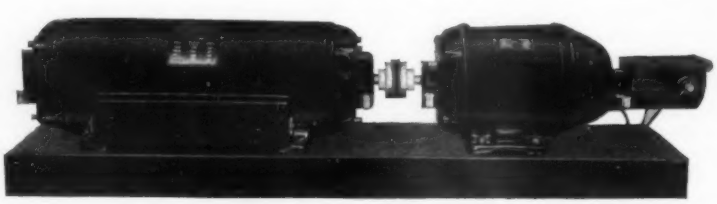
It has no moving conductors and requires neither brushes nor collector rings. Its output is 25 watts.

The generator rotors consist of four solid Alnico castings mounted on a single shaft. The generator is built in a two-bearing frame with wool-packed oil-return bearings, assuring adequate lubrication over long periods of operation. This generator is directly connected to the motor by means of a flexible coupling, both major and generator being mounted on a channel iron base.

The motor in this new ringing machine is of the well-known Holtzer-Cabot design and rugged construction. It can be furnished for either alternating or direct current drive, or both. Mounted on the motor is a speed-governing device to hold the set to an even speed and to insure constant ringing frequencies.

Coin collect and other contact-interrupting devices may be mounted and driven directly from a shaft extension of the generator, should such additional equipment be desired. This generator operates at 1,000 revolutions per minute and is designed to deliver 25 watts at four frequencies—16⅔, 33⅓, 50 and 66⅔ cycles, at 75, 100, 135 and 175 volts, no load.

The overall length of the machine is 54 inches, the width, 10 inches, and the height, 12⅝ ins. The shipping weight is 325 pounds.

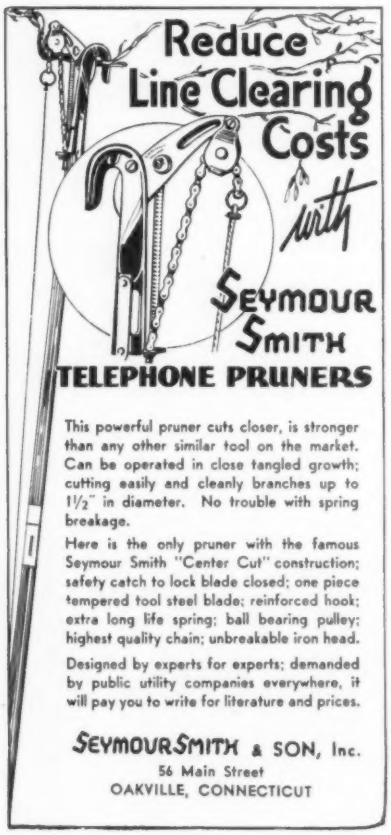


View of Holtzer-Cabot new ringing machine for party-line service.

▼ ▼

Prices in the Metal Markets

New York, N. Y., September 6: Copper steady; electrolytic spot, 10.12½; export, 10.25. Tin barely steady; spot and nearby, 43.00; forward, 43.10. Lead steady; spot, New York 4.90@4.95; East St. Louis, 4.75. Zinc steady; East St. Louis spot and forward, 4.75. Aluminum, virgin, 99 per cent, 20.00. Antimony, spot, 14.00.


Reduce
Line Clearing
Costs
with
SEYMOUR
SMITH
TELEPHONE PRUNERS
This powerful pruner cuts closer, is stronger than any other similar tool on the market. Can be operated in close tangled growth; cutting easily and cleanly branches up to 1½" in diameter. No trouble with spring breakage.
Here is the only pruner with the famous Seymour Smith "Center Cut" construction; safety catch to lock blade closed; one piece tempered tool steel blade; reinforced hook; extra long life spring; ball bearing pulley; highest quality chain; unbreakable iron head.
Designed by experts for experts; demanded by public utility companies everywhere, it will pay you to write for literature and prices.
SEYMOUR SMITH & SON, Inc.
56 Main Street
OAKVILLE, CONNECTICUT

TO FILL YOUR ORDERS NOW

The Pick of the Pines for Better Poles

Pressure-treatment of poles is only half the story. The other half consists of doing the job *right*. Adequate service facilities for storage, framing and handling, also explain why so many users depend on The Wood Preserving Corporation for *all* of their pole requirements. Large stocks at our well-equipped treating plants are ready for you at all times.

THE WOOD PRESERVING CORPORATION
PITTSBURGH, PA.
Subsidiary
NATIONAL LUMBER & CREOSOTING COMPANY
TEXARKANA, ARK.-TEX.

a KOPPERS subsidiary

"Telephony's" Engineering Data

By B. C. BURDEN

Index, General.
September 10, 1938.
No. 47-A, Page 13.

Theory of Modern Television (Ctd.)

In order to scan the scene focused on the iconoscope photo-electric plate, *a scanning voltage,* which sweeps the cathode beam back and forth across the photo-electric plate is necessary. This is generated by units generally referred to as the *deflection voltage generators.* These generators must be synchronized with similar devices at the television receiver in order that the transmitted and received television picture be taken apart and assembled in proper order and in synchronism.

This requires some synchronizing method. The modern television system makes use of synchronizing impulses which are generated by a *synchronizing impulse generator.* These impulses are superimposed on the television signal and transmitted with it to the distant receiver. Oscillators of the vacuum tube type are used for deflection voltage generators.

Ordinary 60-Cycle Power Used for Timing

In order to establish fixed frequencies of operation for the synchronizing and scanning circuits, the ordinary 60-cycle power supply acts as a timer inasmuch as television transmitteers and receivers are generally located in the same area and, hence, operate from the same 60-cycle power supply.

This brief description of the basic elements of a television transmitter omits certain units necessary for satisfactory

NO. 3 UNIQUE—

A TORCH THAT CAN "TAKE IT"

Powerful flame 1¼ x 7"—2000° F. Not affected by wind or cold.

Removable orifice block and cleaning needle—fine control.

Safe steel tank—brazed fittings, welded bottom, funnel filler.

Wt., 4¼ lbs. Price, $6.80. Try one for 30 days?

UNIQUE MANUFACTURING CO., Inc.
221 W. WALTON ST. CHICAGO, ILL.

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By B. C. BURDEN

Index, General.
September 10, 1938.
No. 47-A, Page 14.

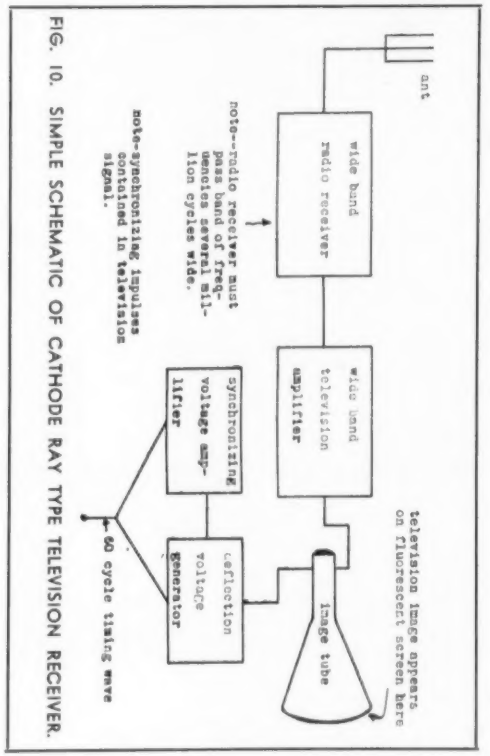
ant
wide band radio receiver
note--radio receiver must pass band of frequencies several million cycles wide.
note-synchronizing impulses contained in television signal.
synchronizing voltage amplifier
wide band television amplifier
60 cycle timing wave
deflection voltage generator
image tube
television image appears on fluorescent screen here

FIG. 10. SIMPLE SCHEMATIC OF CATHODE RAY TYPE TELEVISION RECEIVER.

operation and these will, of course, be described in complete detail later. In speaking of the television transmitter it should be kept in mind that the frequencies involved, which must be transmitted through the several amplifiers up to the radio oscillator, are in the order of several millions of cycles; hence, they require rather unusual types of amplifiers.

Simplified Schematic of the Television Receiver

Let us now pass to the circuit of a simplified television receiver as is shown in Fig. 10. It will be observed that the television signal is picked up by an antenna and amplified

"Telephony's" Engineering Data

By B. C. BURDEN

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and detected by a high frequency radio receiver. From the receiver, it passes into a special television amplifier and then into the image tube, or kinescope as the RCA type image tube is called. This tube is merely a special type of cathode ray tube similar to those used in oscillographs.

The image tube serves to convert the incoming television signal electrical variations into light variations in order to trace the picture on the flourescent circular cathode ray screen.

A deflection voltage generator is required to reassemble the television signal on the screen of the cathode ray tube.

A special *synchronizing unit* which picks off the *synchronizing impulse* transmitted with the television signal is also required.

The Television Iconoscope

One of the most important units of television equipment is the pickup device whose purpose is to view the scene which is to be televised and to convert the variations in light coming from different portions of the scene into variations in electricity.

The term *pickup tube* is the accepted designation for this unit. It is also referred to as the "Iconoscope (an RCA trademark name), the *camera tube,* the *mosaic tube,* and the *image disector.* Inasmuch as one of the most popular and successful of the pickup tubes thus far developed is the Iconoscope (a product of the RCA Mfg. Co., and developed by V. K. Zworykin), it will be discussed in detail.

The necessity for and purpose of the pickup tube in television is to dissect or "take apart" the scene to be televised and to convert each of the tiny *elements* which represent the scene into a quantity of electricity proportional to the light from the element. This varying quantity of electricity is then transmitted to the distant television receiver where it is used in reassembling the scene in the exact sequence and light value as it appears to the pickup tube at the transmitter.

Scanning Necessary in All Systems

It should be appreciated at the outset that all present-day television systems require that the scene to be televised be divided into thousands of tiny pieces, or elements as they are called. By means later to be described, it is necessary that the pickup tube evaluate into electricity the magnitude of light coming from each of these tiny elements.

Ahead OF DESTRUCTION

EVEREADY
COLUMBIA
TRADE-MARKS
GRAY LABEL
LONG LIFE
TELEPHONE CELL
This dry cell is the original telephone cell greatly improved and is built especially for telephone use. It delivers long service life with uniformity and dependability in the highest degree.
NATIONAL CARBON CO. Inc.
UNIT OF
UNION CARBIDE UCC AND CARBON CORP
MADE IN U.S.A.

No HORROR rides the night wind like a forest fire…but messages of warning, calls for men and equipment, directions to the fire fighters speed still faster, thanks to the telephone.

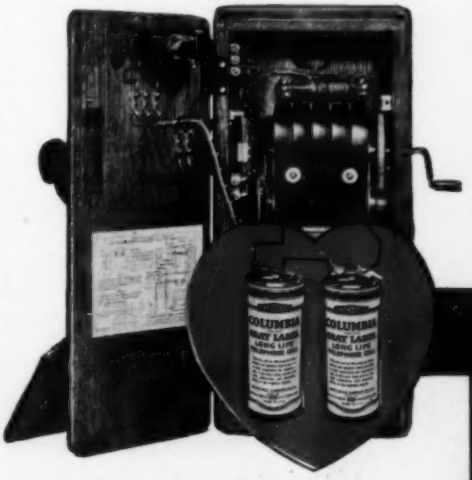
In the age-long conquest of this roaring, murdering terror of the big woods, man has forged no other weapon so powerful as the instrument that speeds the human voice ahead of the destruction. And the *action* that people expect and get, is ever in the keeping of the dry cell.

Because subscribers must have service, whether they wish to swap recipes or avert catastrophe, the "Eveready," "Columbia," "Gray Label" Long-Life Telephone Cell is first-choice with seasoned telephone men the country over. They find *sustained voltage* and *consistent economy* serve management and subscriber equally well.

NATIONAL CARBON COMPANY, INC.
General Offices: New York, N. Y.
Branches: Chicago, San Francisco

Unit of Union Carbide UCC *and Carbon Corp.*

The words "Eveready," "Columbia" and "Gray Label" are trade-marks of National Carbon Company, Inc.



The Heart of the Magneto Telephone

221 W. WALTON ST. CHICAGO, ILL.

CLASSIFIED SECTION

Rates 10 cents per word payable in advance.
Minimum charge $2.00 for 20 words or less.

HELP WANTED

MANAGER WANTED—Experienced all around telephone man, age 25 to 40, for district manager of area serving 2,500 telephones. Attach small kodak picture to letter of application, giving age, references and experience. Address 8730, care of TELEPHONY.

MANAGER WANTED—Man having experience, capable of operating telephone company having exchange area serving 9,000 telephones. Age must be between 30 and 40. Give experience, references, and age with small photograph. Will consider confidential. Address 8731, care of TELEPHONY.

WANTED—Auditor capable of supervising accounting of Class A telephone company. Enclose small photograph with application outlining education, age, experience in telephone accounting and references. Replies will be treated confidentially. Address Telephone Management Co., 16th floor, Lincoln Tower, Fort Wayne, Ind.

TELEPHONY ADVERTISERS
will give you service which will be pleasing

NORTH ELECTRIC MAGNETO SWITCHBOARD EQUIPMENT

No. 69 line jacks, double cutoff

No. 4 drops—10 per strip

No. 4—plugs

No. 94 keys

Switchboard generators

(Practically New—Save 50%)

BUCKEYE TELEPHONE & SUPPLY CO.
COLUMBUS, OHIO

NEW STYLE STEWART CABLE TESTERS

With balanced coil. Locates shorts, crosses, grounds and wet spots; also tone circuit.

$54.00 Sent on trial.

STEWART BROS.
Ottawa, Ill.

POSITIONS WANTED

POSITION WANTED: Thoroughly capable man wants position with progressive telephone company. Experienced Wire Chief, switchboard equipment repairman and installer; some engineering experience; can supervise group of exchanges and men with results. Address 8742 care of TELEPHONY.

AUDITOR, experienced in Class "A" telephone accounting, all phases, desires position with company in the middle west. Address 8711, care of TELEPHONY.

POSITION WANTED—Registered electrical engineer, State of Ohio; university graduate; five years' telephone experience outside plant construction, maintenance—central office and outside plant, also plant engineering. Five years appraisal engineer, power and light company. Seeks position as telephone company manager or construction superintendent. Address 8709, care of TELEPHONY.

YOUNG MAN desires plant maintenance job, either inside or outside. Nine years' varied experience. Address 8719, care of TELEPHONY.

CABLE-SPLICER, good on locating and clearing all cable trouble. Good switchboard man and trouble-shooter. Can give results instead of excuses. Have complete testing equipment. Address 8662, care of TELEPHONY.

POSITION WANTED — University Graduate B. E. E. '35, with 7 months' engineering and dial equipment installation training with large manufacturer of telephone equipment, seeks junior position with telephone company or manufacturer. Address 8720, care of TELEPHONY.

MAN AND WIFE want magneto exchange to operate. Experienced. Good reference. Prefer Ohio, Indiana or nearby state. Available now. Address 8685, care of TELEPHONY.

CARPENTER MASTER-LIGHTS

ANNOUNCE THE NEW TYPE "T&T" DUPLEX LIGHT FOR TELEPHONE REPAIR CREWS.

Searchlight beam for 10-ft. circle at top of pole.

Floodlight for inside and underground jobs.

USES TWO NO. 6 TELEPHONE DRY CELL BATTERIES.

STURDY—VERY POWERFUL.

CARPENTER MASTER-LIGHTS ARE STANDARD WITH A HUNDRED TELEPHONE, TELEGRAPH AND ELECTRIC COMPANIES.

Write for a "T&T"
on approval

CARPENTER MFG. CO.
CAMBRIDGE MASSACHUSETTS

COMMISSION RULINGS AND HEARINGS

(Continued from page 42)

five-party (wall), $2.00; business rural, $3.50 and residence rural, $2.00.

August 31: Conditioned that its action shall not result in any increase in rates or the adoption of practices detrimental to the public, the commission approved and filed a new toll contract between the Lynchburg-Mt. Orab Telephone Co. and the Ohio Bell Telephone Co.

Oklahoma Corporation Commission

August 30: Authority granted the Southwestern States Telephone Co. to install a full metallic common battery, non-attendant automatic telephone service at its Paden exchange.

September 2: The commission granted request of the Mutual Telephone Co., of Okeene, to dismiss its complaint against the Consumers Rural Electric Co., because the controversy has been settled. The telephone company had alleged interference with its service from the REA power line.

September 28: Hearing on complaints of the Southwest Telephone Co. vs. the Intercounty Electric Co-operative of Norman, and of the North Union Telephone Co. vs. the Alfalfa County Electric Co-operative of Cherokee, Okla., alleging inductive interference and asking for relief. Similar complaints were first heard before the commission March 17, 1938, and continued until after the commission decided whether it had jurisdiction over REA-financed electric power projects.

The commission issued an order June 16 holding that it had no jurisdiction over the subject matter in such complaints where telephone companies with grounded lines sought to require rural cooperative power lines, financed by the REA, to share with them the cost of making the telephone lines metallic or moving pole lines to eliminate inductive interference.

At the September 28 hearing the commission will determine whether it will dismiss the Southwest Telephone Co. and the North Union Telephone Co. complaints for lack of jurisdiction to enforce commission order No. 1946 amended by order No. 17086 against the rural cooperatives.

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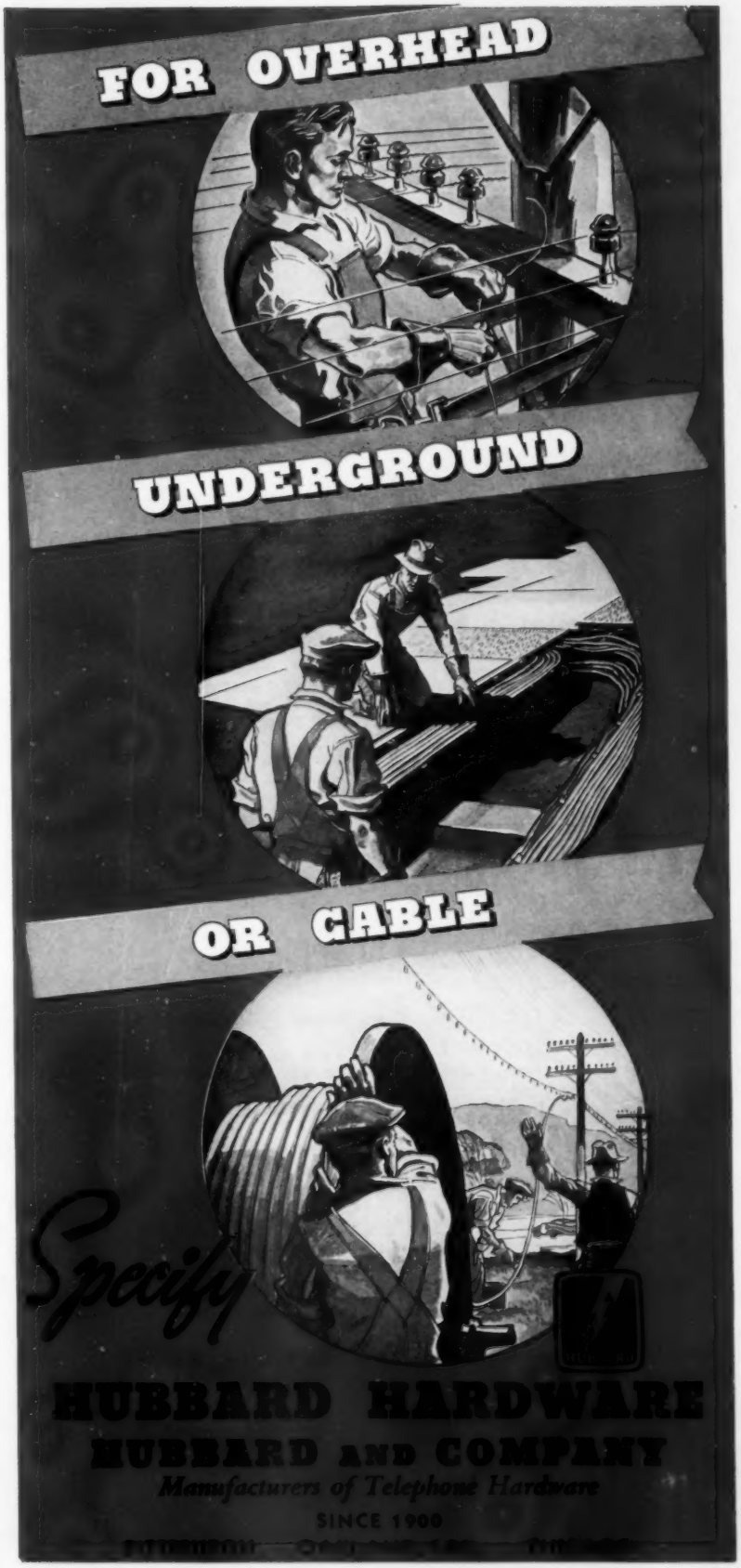
September 6: Hearing in Madison in case of the Bonduel Telephone Co.

September 7: Hearing in Madison on application of Commonwealth Telephone Co. for authority to remove its telephone line located in towns of Couderay and Edgewater, Sawyer county.

September 7: Hearing in Madison on application of Commonwealth Telephone Co. for authority to revise telephone rates and to install automatic dial service at its Dodgeville exchange.

September 8: Hearing in Madison on application of Commonwealth Telephone Co. for authority to install dial equipment, to increase and revise rates at Belleville exchange.

September 8: Hearing in Madison on application of the Commonwealth Telephone Co. for authority to increase rates and install automatic dial equipment at its Witwen exchange.

September 9: Hearing in Madison on application of Commonwealth Telephone Co. to discontinue local magneto service at Mineral Point.